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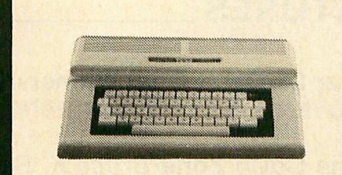

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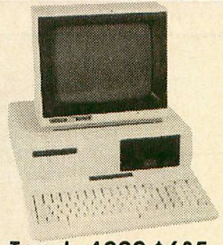

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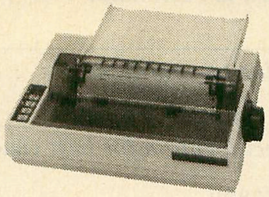

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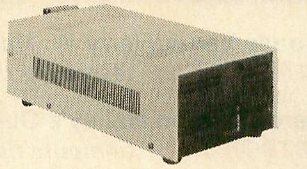

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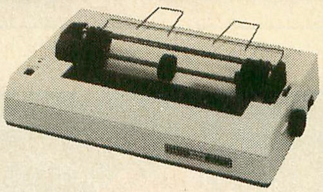

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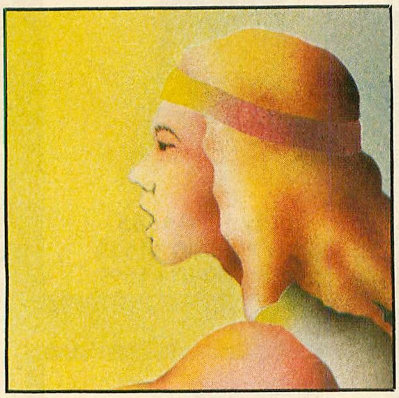

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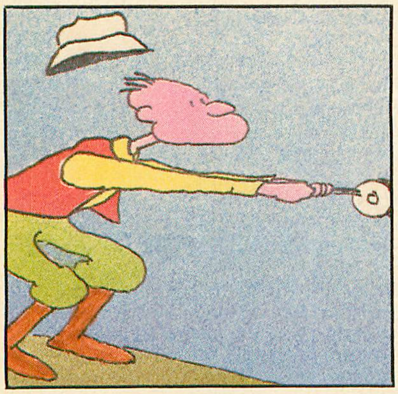

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📼 The small cassette tape symbols beside features and regular columns indicate that the program listings with those articles are on this month's RAINBOW ON TAPE, ready to CLOAD and RUN. For full details, check our RAINBOW ON TAPE ad on Page 183.

NEXT MONTH: The smell of the ink ribbon, the roar of the printer! Our May issue will feature some "printer's devil" delights. We'll highlight printer capabilities with screen dump programs, crossword puzzle generators and much more! May will include our usual abundance of useful programs and games, hardware and software product reviews.

Look to THE RAINBOW for *the* printed word — the best source of information anywhere for the Color Computer.

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LETTERS TO THE RAINBOW

CoCo Sherlock Misses the Color Clue

Editor:

I have been working on programs that use artificial color in `PMODE 4` for some time now. I know the colors switch randomly when you press Reset or turn the computer off. Is there any way for the program to detect if the color is reversed other than the standard "If the border is blue press Reset. If the border is red press any key."

Jeremy Spiller
Shirley, MA

Editor's Note: The artifacted colors are due to the signal received by the television or monitor, thus the computer has no way of detecting which is set.

Editor:

I was wondering if there is a `POKE` to stop the `LIST` command.

Scott Henry
Hermitage, PA

Editor's Note: Try `POKE 383,158` to disable and `POKE 383,0` to restore the `LIST` command.

Editor:

When I `POKE` with an `&H` in the `POKE`, my computer gives me a syntax error. For that matter, anything with an `&H` in it gives me an SN Error. Could you tell me what is wrong?

Matt Chesmore
Rowley, IA

Editor's Note: The `&H` prefix only works with Extended Color BASIC.

BACK TALK

Editor:

In the December 1985 issue of THE RAINBOW [Page 6], a reader asked if there have been any improvements to the "Simple Text Processor" that was published in the January 1985 issue [Page 103]. Yes, I have revised it in many ways. I have added a page pause feature for printing on single sheets of paper. I have changed the underlining code from '<' and '>' signs to a single SHIFT@ key control, which appears on the screen as a square block. I have added sound for the main menu (sounds beep if wrong key is pressed). Any ASCII file (like BASIC programs) can be loaded from the disk. I have also added a slashed zero feature for typewriters that do not print slashed zeros. The revised *TextPro* is completely position-independent. If anyone is interested in these changes, contact me at 1423 N. Cleveland Street, 92667, (714) 639-3996.

Ashok Basargekar
Orange, CA

No Envy Necessary

Editor:

I read THE RAINBOW front to back as soon as it arrives in the mail. Tom Heiliger's letter in the February 1986 issue, Page 6, stuck out because of the word "envious" in reference to the Amiga. I was sure that word was reserved for other computer owners to use when speaking of the CoCo!

Mr. Heiliger has had his CoCo for over a year and should be reminded to dig deeper into THE RAINBOW for the scoop about multitasking. A few drives here and there and the OS-9 system should make Tom stand up and drop his envy. Tom, get ready for 35-meg hard drives, two Deluxe RS-232 Paks, a modem and a couple of different printers all at the same time. With the new 2.0 Version of OS-9, I doubt the CoCo will be obsolete anytime in the near future!

Mike Redelsheimer
St. Louis, MO

Gathering the PEEKs, POKEs and EXECs

Editor:

In the December 1985 issue my letter appeared on collecting `PEEK`s, `POKE`s and `EXEC`s. For this, I thank you. The response I received was terrific, and because of that, this should be a super list. I am writing to let everyone know who sent me a list that I have a good start on the organization of all the data I've received. Rest assured that some day you will get a cumbersome letter in the mail and my proposition will be fulfilled.

To those who didn't see my previous letter, refer to "Letters to the Rainbow" in the December 1985 issue, Page 8. You can also find my address there. I've decided I will make a deadline of April 30. Any contributions received after that will go on an updated list.

David Mount
West Monroe, NY

Choosing Chips

Editor:

I wish Tandy would have updated their

Color Computers with ROM chips containing features such as those found in *CoCo Max*. Also, it would be nice if they could make the Color Computer easier to program by doing away with the `FOR-TO-NEXT` loop and substituting a simple statement. This would help to bring BASIC closer to English. I find it very hard to follow three-dimensional graphics programs that require initial values to be set for a number of parameters. Maybe they should think about an extended graphics chip. In fact, it would be nice to have a choice of chips to tailor your computer.

Travis Burford
Valhalla, NY

Delphi Enthusiast

Editor:

Congratulations on the great work your staff is doing on the CoCo SIG on Delphi. It's fantastic! If there are any CoCo enthusiasts out there who haven't joined yet, I encourage them to do so immediately!

Leonard K. Hult
Dallas, TX

HINTS AND TIPS

Editor:

For those readers who are using Roger Schrag's great *Super Patch EDTASM+* [September 1983, Page 66], I have a hint as to how to change the Baud rate to suit their printing needs.

First, load *Super Patch* but do not execute, then `POKE &HE26,x;` with 'x' being the new Baud rate code. Poking `&H26,1` will, for example, change the Baud rate to 9600. Next, resave the program using `SAVEM "name",&HE00,&H37FF,&HE00`.

Lee Glawe
Waukesha, WI

Extraordinary Print

Editor:

I have a little hint that anyone with a DMP-105 printer and *Color Scripsit* may be interested in. If you are tired of the ordinary print style that is selected automatically when the printer is powered up, here is relief for your boredom. Turn your computer and printer on and enter the printer character style code. For example, here is the code for bold type: `PRINT #-2, CHR$(27); CHR$(31)`. After that, turn off the computer without turning off the printer. Insert *Color Scripsit* and turn the computer on. If you follow these instructions, when you print your document, it prints in the typestyle selected.

Jason Johnston
Lillooet, British Columbia

Error Subterfuge

Editor:

I have a tip for those with ADOS from Spectrosystems who use the `ERROR` command. You may have already noticed that the `RENUM` command totally ignores any line number after `ERROR` while it rearranges all the rest. To get around this, edit your line with the `ERROR` command in it and directly after it, place a `GOTO` or `GOSUB` to the same line. For example, if Line 10 reads `ERROR 1340` then edit it to read `ERROR 1340: GOTO 1340`. When the computer completes the `RENUM`, just edit Line 10 and rematch the line numbers, deleting the additional `GOTO`.

Eric Santanen
Stanhope, NJ

Green Screen

Editor:

A small tip that some *CoCo-Lisp* users may find handy. Initially, the *CoCo-Lisp* screen is set to Hi-Res buff. Since this causes artifact colors, the following function can be defined to make the screen green:

```
(DEFINE '(
  (GREEN (LAMBDA ( ) (POKE &HFF22
  244)))
))
```

The function GREEN can then be called by:

```
(GREEN)
```

Eric Richards
Auburn, AL

A Friend in *DeskMate*

Editor:

Just a quick note about a piece of software I've come across, *DeskMate*.

I've grown weary of complex writers such as *VIP*. *DeskMate* is very simple, but serves most of my needs. The documentation is good but almost not needed; help is to be had almost everywhere. The 32 characters across is fine because I'm not on a tablecloth.

The part I don't like is the *PAINT* file. It uses memory and is a waste. The $100 price tag is deceiving though — my deluxe joystick doesn't compare to a mouse.

Go ahead and review it. You will find little use for the documentation because it's so friendly.

Gary Pagac
SPO, WA

Editor's Note: Read the review of *DeskMate* on Page 198 of this issue.

Assembler Agony

Editor:

In reference to the assembly article, "What's the Diagnosis?" Page 67 of the February 1986 issue, I've been had again. THE RAINBOW is ahead of the tape this month and as the program looked interesting, I loaded *EDTASM* and got at it — spent three hours typing and when I tried to assemble it, it bombed. This has happened to me several times. I can make it if the program is for Radio Shack's *EDTASM* or there are instructions for changing the things that won't work as printed. Colin Stearman didn't use it but explained how to make it work.

I realize there are several assemblers out there and most may be better than the *EDTASM*. However, I can't help but believe that we must be a large portion of your readers. It would be nice if the assembler the author used was noted in the first part of the article even if he won't or can't tell us what needs to be changed for *EDTASM*. At the time I bought my CoCo, I was living out in the sticks in western Nebraska and could find no one who could answer my questions about assembly language programming. I bought *CCEAD*, which was a waste of money since when it arrived they said, "Here it is, if you don't understand it, go buy a book." I did that but the books at that time started at the middle and worked from there. Didn't really get off the ground till I got a DOS assembler. However, there were more and more good programs coming that I was unable to convert to this DOS (it's tough to teach an old dog new tricks).

I now have the Disk BASIC and use Stearman's mod part of the time. I live close to a CoCo club with over 60 members and have all kinds of expert help.

William P. Frame
Niceville, FL

A Closer Look

Editor:

I would like to make a suggestion for your reviews section in RAINBOW. I think you should consider using photographs of the actual product to help describe your reviews. This would help the reader from paying $30 or more for a program and finding that he or she could have gotten a better version of the same game or utility for a comparable price. I think THE RAINBOW is an excellent magazine, and I particularly enjoyed the Princeton RAINBOWfest last October.

Erik McCullough
Lafayette Hill, PA

REQUEST HOTLINE

Editor:

I own a Color Computer 2 with a DWP-220. I'm a high school Spanish teacher and have been trying to get a listing for some Spanish software and Spanish character print wheels for my printer but have been unsuccessful. Any help in this matter would be greatly appreciated. Write to me at 24 Howe Road, 11727.

Anna R. Cuyar
Coram, NY

Come Fly with Me

Editor:

I have owned a CoCo for about a year now and think it's about the most useful tool I've ever owned. I also fly airplanes in my spare time and would like to combine both hobbies, except that I have not seen a program written for the CoCo concerning flight planning. I have seen many ads for aircraft flight planning written for just about any computer you can name. Surely CoCo can handle the job!

Does anyone know of any programs that exist concerning this issue? Any help would be greatly appreciated. My address is 39 Edgewood Road, 63701.

Eric Thompson
Cape Girardeau, MO

Credit Lines

Editor:

I have owned my CoCo for a little over a year. I use it mostly for writing letters (on *Telewriter-64*), doing spreadsheets (on *Elite*Calc*) and for financial work. Since I don't have time to learn to program, I must rely on either commercial software or articles in THE RAINBOW.

I am currently looking for a program to provide a payment schedule for lines of credit. It must be able to list each monthly payment and the amount of interest and principal for each payment for the life of the loan (similar to many amortization programs). It must also be able to handle increases in the balance outstanding (i.e., drawing on the line), pre-payments, changes in the interest rate on a monthly basis and variances in the term of the line. I own a gray box CoCo, upgraded to 64K, with a cassette system. I would appreciate any assistance you could provide. My address is 55 Glaston Court, 12186-9567.

Lee B. Pearsall
Voorheesville, NY

A Last Resort?

Editor:

I would like to know if there are any good programs for running a resort. I think I would need a very good calendar program. You have to put down (on paper) when, how long and where (which cottage) people are staying. I am using a 64K CoCo tape-based system with an Epson LX-80 printer. Send any information to me at 14329 Cleveland, 60469.

Craig J. Vincek
Posen, IL

'Bridging' the Gap

Editor:

I am a bridge game buff and an owner of the Radio Shack CoCo 2 64K computer. Why is it that I cannot find a game manufacturer that produces a software game which will randomly deal over 1,000,000-plus deals of bridge hands that I can either bid or defend against with the aid of the computer?

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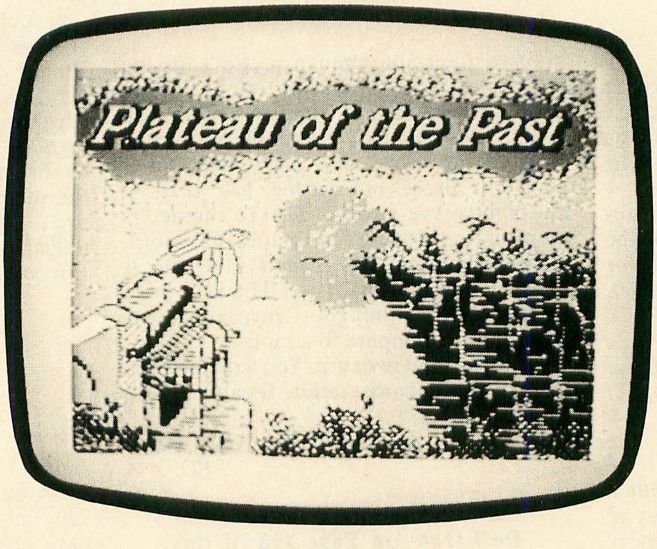

Actual screen graphic!

100% machine language HI-RES, color, graphic adventure!

Battles orchestrated blow by blow!

Are you tired of being forced to constantly type directions or pick up and put down provisions? Are you frustrated at discovering the right logic only to be stumped by the game's vocabulary? **Plateau of the Past** eliminates these annoyances without sacrificing excitement. If you enjoy the challenge of a fast-paced adventure, then this game is for you!

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Such games are available for the Commodore 64K, Apple, IBM PC and Zenith computers but not for the Radio Shack Tandy PC. I already own *Bridge Tutor* from Radio Shack and am looking for something a little more sophisticated to sharpen my skills. Anyone knowing of one, write to me at 9587 Via Bernardo, 91504.

Matt Kusior
Burbank, CA

Editor:

I was just reading the February 1986 issue of RAINBOW and I noticed a lot of requests for specialty programs for farming and ranching. I am not a professional scientist, I am not even an amateur one, but I do like science, especially astronomy, and I would like to see more software about the sciences. There are plenty of kiddy programs, but I would like serious explanatory, discovery or self-teaching programs that would delve deeply into a subject [so one could] really learn it thoroughly.

I don't know where you can get a college level, self-teaching program for the CoCo, or an upper division geology, physics, astronomy, biology, engineering, electronics, oceanography course, etc. Are there any such courses or programs and where can I purchase them? My address is 7136 Tait Street, 92111.

Thomas F. Heiliger
San Diego, CA

No Sleeping on the Job

Editor:

I have a new colon (:). Fact is, I had it all the time but I didn't know where to put it. For six months I lay sleepless — worry, worry, worry!

Then in "Corrections" for RAINBOW February 1986 [Page 168], the Delbourgos said if I would refer to Line 150 in *Earthrot* (August 1985, Page 73) and put it between `THEN` and `CSAVEM`, it would solve my problem.

Glory be! It sent my world spinning. If I knew what to `POKE` to slow it down, I could go back to sleep.

M.S. "Mac" McPherson
Dallas, TX

The Underestimated Printer

Editor:

Each month as I page through THE RAINBOW, I see several ads for various printers to use with the CoCo but hardly any for the Toshiba printers. I recently bought a Toshiba P1340 and, having investigated all the other printers that are popular among CoCo owners, I must say there is no other printer that even approaches it for the combination of quality and speed. Furthermore, if you buy the serial version of the printer, all you need to run it are the right plugs correctly wired on a serial cable. No special interface is necessary. With the Toshiba's ability to print letter quality (not *near*-letter quality) and the fonts and character sets it offers, which can be accessed via the control codes in a word processor such as *Telewriter-64*, it's hard to imagine any printer offering more versatility and quality for the CoCo owner.

I am writing this letter for two reasons: First, there may be other CoCo owners who have wanted to get this particular printer but have received conflicting advice from salespeople about whether or not it runs with the CoCo. The answer is yes, not only does it run with the CoCo, it runs beautifully. It is only a matter of having the right cable and setting the right DIP switches.

Second, the Toshiba also has excellent capability for graphics, but as far as I can find out, none of the standard CoCo graphics programs will drive it. I have *ViziDraw* and that doesn't work. It seems a shame to have two excellent graphics tools as the CoCo and the Toshiba and not have them working together. Is there anyone out there who has the Toshiba and has written a graphics printer driver for it? If so, I would appreciate hearing from you. My address is 119 Queenlily Road, 19057. I would also be glad to offer any help to anyone who wants to know about running the Toshiba with the CoCo and, in particular, with *Telewriter-64* (a marriage made in computer heaven).

John Beuttler
Levittown, PA

INFORMATION PLEASE

Editor:

My friend has recently purchased a 64K upgrade from Radio Shack for his CoCo 2. The chips came without instructions. If you could supply instructions it would be greatly appreciated.

Ezra Dreisbach
Vashon, WA

Editor's Note: Check out Ed Ellers' article, "RAM/ROM Upgrade Roundup," May 1984, Page 49.

Editor:

Having both *Graphicom* and *Graphicom II*, I am very interested in the incredible graphics that are being sent in [for "CoCo Gallery"]. I would like to know if there is any way of getting these "works of computer art."

One of my motivating reasons [for this] appeared in the July 1985 RAINBOW [Page 179], this being Hal Katschke's "Hood." I would be very proud to be able to add this portrait to my own CoCo Gallery.

Thank you for producing a magazine worthy of the Color Computer. Keep up the informative articles and, especially, the "CoCo Gallery."

Lance McComber
Prince George, British Columbia

Editor's Note: Many BBSs around the country have picture libraries as downloads. We are considering putting out a "CoCo Gallery Collection" disk. Stay tuned.

Editor:

I recently purchased a disk drive for my CoCo, which has been modified for 64K, and would like to purchase a good editor/assembler on disk but haven't seen any ads. I'm interested in those available by mail order as I'm stationed on Adak Island (Aleutian chain) and computer stores just aren't available! Can you recommend any 6809 editor/assemblers for disk?

John Bowden
FPO Seattle, WA

Editor's Note: It would not be fair for us to recommend one of our

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advertisers' products over another. They are there in the ads. If you want, you could try OS-9. It comes with a built-in editor/assembler.

Code for Condensing

Editor:

In your January 1986 issue of RAINBOW, Page 210, there is a one-liner program called *Labeler.* I am using a CoCo 64K model #3127 and a DMP-105 printer. The program works just fine. My question is, what changes can I make to have the printing in either condensed or compressed type instead of standard print?

Harry Marcus
Las Vegas, NV

Editor's Note: Check your printer manual to find the codes required to accomplish these styles. Then just add lines at the beginning of the program, such as:

```
PRINT#-2, CHR$(X)CHR$(Y)
```

where 'X' is the escape code (27) and 'Y' is the code for what you want the printer to do.

Scoreboard Blues

Editor:

I was disappointed to discover that both "Scoreboard" and "Scoreboard Pointers" were missing from the February 1986 issue. I know you said in an earlier issue that the two had a low readership, but this was according to a survey taken at a RAINBOWfest, and I would doubt the validity of this survey in connection with the *overall* readership of the magazine . . .

Richard Salomon
Plymouth, IN

Editor:

I have had a subscription to THE RAINBOW for a little under a year . . . one of my favorite parts is "Scoreboard" and "Scoreboard Pointers." I was so surprised when I looked for it in the February 1986 issue and found that you had canceled it. I think the "Scoreboard" was a very good part of THE RAINBOW, and that it should be continued. With "Scoreboard" and "Scoreboard Pointers" gone, I think there will be a big hole in THE RAINBOW.

Brent Brown
Boise, ID

Editor's Note: "Scoreboard" and "Scoreboard Pointers" have not been discontinued; they are now bimonthly columns. Look for them next month.

KUDOS

Editor:

I welcome THE RAINBOW's arrival each month, especially the article dealing with machine language programming and utilities. It was terrific news to hear William Barden, Jr. is writing a monthly column in THE RAINBOW. Your staff becomes better each month. Keep up the excellent work.

James A. Connolly
Prince Edward Island, Canada

Waiting Room Recreation

Editor:

. . . I was considering buying a CoCo for my medical practice to keep records, etc., and knowing there is a fine magazine like yours backing up the product clinches the idea. I'm also considering putting a CoCo with games in a special area in the waiting room for my younger patients to enjoy while waiting . . .

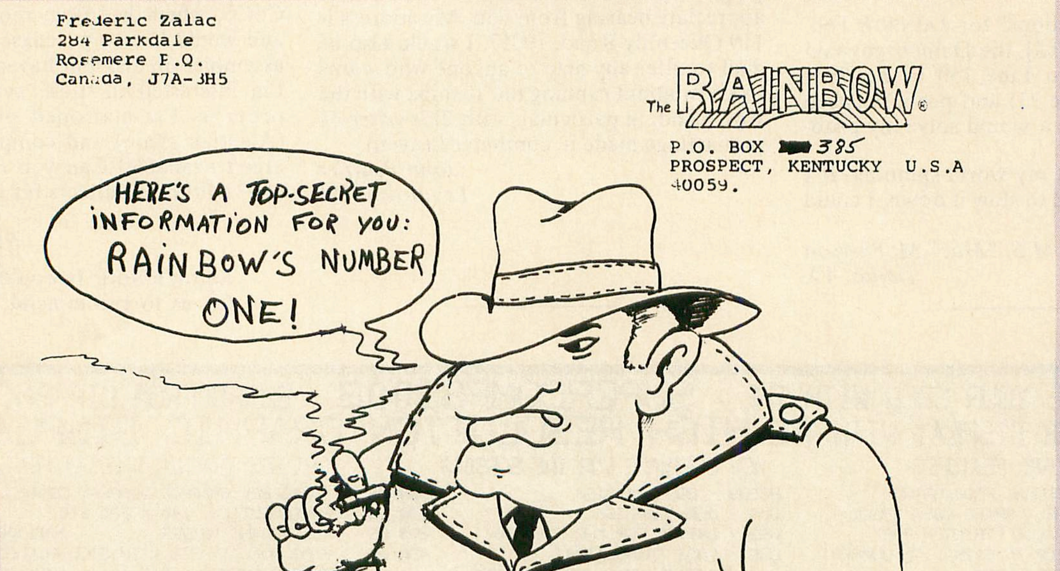
Dr. Mario F. Pistilli
Joliet, IL

THE RAINBOW welcomes letters to the editors. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or space.

Letters to the editors may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type SEND and address to: EDITORS.

Continued on Page 252

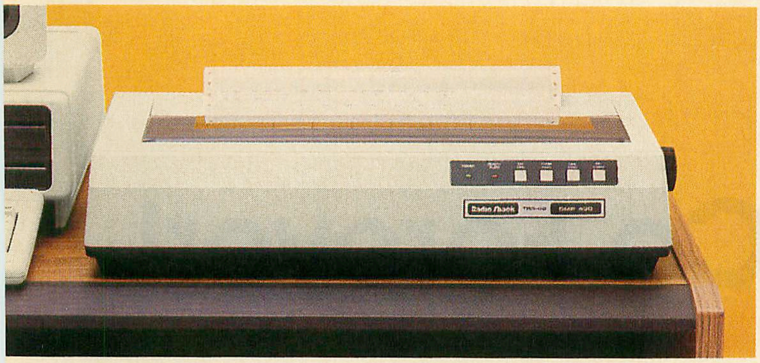
ARTS AND LETTERS

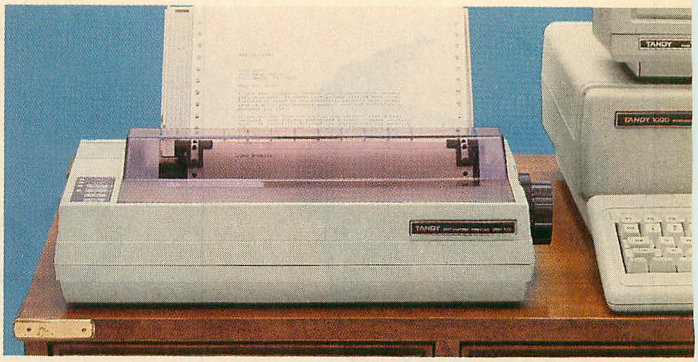


Envelope of the Month

Frederic Zalac
Rosemere, Quebec

Next to your computer,





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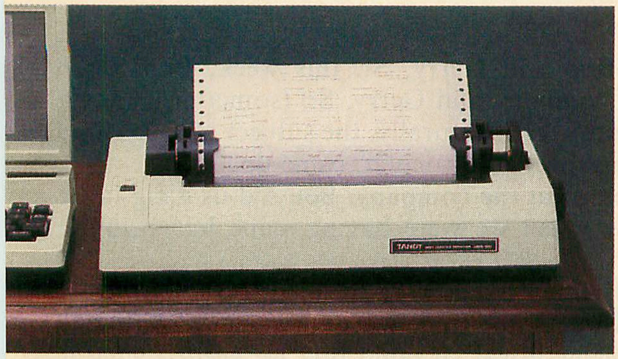

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The CGP 220 (26-1268, $599) quietly prints text and graphics in yellow, violet, red, green, cyan, magenta and black! And because there's no ribbon to wear out or become contaminated, the print quality remains excellent.

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CoCo Forever!

I was having lunch with Bob and Gerry, Sr. this week. Bob is the president of our printing company and Gerry, Sr. (sometimes known simply as "Senior") is the top VP. Naturally, the subject of magazines in general, and computer magazines in particular, came up.

Before there even *was* a Senior at the company, Bob did us a big favor and "took in" THE RAINBOW when we were having some bad printing problems.

As many of you know, the first few issues were "printed" on a photocopy machine at the local drug store. After that, we went to a "traditional" printer for a few issues, but growth was so rapid that we needed what is called a "web" press to keep down costs. We found a web printer locally who could provide high-quality newsprint (white and fairly thick as opposed to the gray thin stuff you get with your newspaper). We were there for about three months, although Bob's company did the cover and bound the magazine together.

One day there was a big problem. The cover "slid" cockeyed when it was folded over the inside of the magazine because the cover was of slick paper and the insides were "full of air." Our web printer needed something called a perforator wheel to cut air holes in the pages and, without it, the insides were blooming out and caused the cover to slide.

We were printing something like 15,000 copies of THE RAINBOW at the time — a pretty small press run for Bob's company. For the kind of big magazine presses they had (also web presses, by the way), they needed to run at least 20,000 for it to be worthwhile for them and for us. In addition, we had enough newsprint to print one more issue of THE RAINBOW and Bob's presses would require an immense cleanup if he used the paper that was on hand. Yet, he did it, and we've been with Bob's company ever since.

Bob had perforator wheels, of course. After one more issue of "newsprint insides" we went to "slick" pages — and a month after that we were past the 20,000 copies we needed to make using Bob's plant really economical.

It has been a good relationship for both of us, of course. We've got a local printer who "understands" us (most of the time), and Bob's company gets about one-fourth of its gross revenue from us. They also print our other publications, PCM, SOFT SECTOR and VCR.

Telewriter-64™

the Color Computer Word Processor

- **3 display formats: 51/64/85 columns × 24 lines**
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- **User-friendly full-screen editor**
- **Right justification**
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- **No hardware modifications required**

THE ORIGINAL

Simply stated, Telewriter is the most powerful word processor you can buy for the TRS-80 Color Computer. The original Telewriter has received rave reviews in every major Color Computer and TRS-80 magazine, as well as enthusiastic praise from thousands of satisfied owners. And rightly so.

The standard Color Computer display of 32 characters by 16 lines without lower case is simply inadequate for serious word processing. The checkerboard letters and tiny lines give you no feel for how your writing looks or reads. Telewriter gives the Color Computer a 51 column by 24 line screen display with *true lower case characters*. So a Telewriter screen looks like a printed page, with a good chunk of text on screen at one time. In fact, more on screen text than you'd get with Apple II, Atari, TI, Vic or TRS-80 Model III.

On top of that, the sophisticated Telewriter full-screen editor is so simple to use, it makes writing fun. With single-letter mnemonic commands, and menu-driven I/O and formatting, Telewriter surpasses all others for user friendliness and pure power.

Telewriter's chain printing feature means that the size of your text is never limited by the amount of memory you have, and Telewriter's advanced cassette handler gives you a powerful word processor without the major additional cost of a disk.

> *...one of the best programs for the Color Computer I have seen...*
> — Color Computer News, Jan. 1982

TELEWRITER-64

But now we've added more power to Telewriter. Not just bells and whistles, but major features that give you total control over your writing. We call this new supercharged version Telewriter-64. For two reasons.

64K COMPATIBLE

Telewriter-64 runs fully in any Color Computer — 16K, 32K, or 64K, with or without Extended Basic, with disk or cassette or both. It automatically configures itself to take optimum advantage of all available memory. That means that when you upgrade your memory, the Telewriter-64 text buffer grows accordingly. In a 64K cassette based system, for example, you get about 40K of memory to store text. So you don't need disk or FLEX to put all your 64K to work immediately.

64 COLUMNS (AND 85!)

Besides the original 51 column screen, Telewriter-64 now gives you 2 additional high-density displays: 64 × 24 and 85 × 24!! Both high density modes provide all the standard Telewriter editing capabilities, and you can switch instantly to any of the 3 formats with a single control key command.

The 51 × 24 display is clear and crisp on the screen. The two high density modes are more crowded and less easily readable, but they are perfect for showing you the exact layout of your printed page, *all on the screen at one time*. Compare this with cumbersome "windows" that show you only fragments at a time and don't even allow editing.

RIGHT JUSTIFICATION & HYPHENATION

One outstanding advantage of the full-width screen display is that you can now set the screen width to match the width of your printed page, so that "what you see is what you get." This makes exact alignment of columns possible and it makes hyphenation simple.

Since short lines are the reason for the large spaces often found in standard right justified text, and since hyphenation is the most effective way to eliminate short lines, Telewriter-64 can now promise you some of the best looking right justification you can get on the Color Computer.

FEATURES & SPECIFICATIONS:

Printing and formatting: Drives any printer (LPVII/VIII, DMP-100/200, Epson, Okidata, Centronics, NEC, C. Itoh, Smith-Corona, Terminet, etc).

Embedded control codes give full dynamic access to intelligent printer features like: underlining, subscript, superscript, variable font and type size, dot-graphics, etc.

Dynamic (embedded) format controls for: top, bottom, and left margins; line length, lines per page, line spacing, new page, change page numbering, conditional new page, enable/disable justification.

Menu-driven control of these parameters, as well as: pause at page bottom, page numbering, baud rate (so you can run your printer at top speed), and Epson font. "Typewriter" feature sends typed lines directly to your printer, and Direct mode sends control codes right from the keyboard. Special Epson driver simplifies use with MX-80.

Supports single and multi-line headers and automatic centering. Print or save all or any section of the text buffer. Chain print any number of files from cassette or disk.

File and I/O Features: ASCII format files — create and edit BASIC, Assembly, Pascal, and C programs, Smart Terminal files (for uploading or downloading), even text files from other word processors. Compatible with spelling checkers (like Spell 'n Fix).

Cassette verify command for sure saves. Cassette auto-retry means you type a load command only once no matter where you are in the tape.

Read in, save, partial save, and append files with disk and/or cassette. For disk: print directory with free space to screen or printer, kill and rename files, set default drive. Easily customized to the number of drives in the system.

Editing features: Fast, full-screen editor with wordwrap, block copy, block move, block delete, line delete, global search and replace (or delete), wild card search, fast auto-repeat cursor, fast scrolling, cursor up, down, right, left, begin line, end line, top of text, bottom of text; page forward, page backward, align text, tabs, choice of buff or green background, complete error protection, line counter, word counter, space left, current file name, default drive in effect, set line length on screen.

Insert or delete text anywhere on the screen without changing "modes." This fast "free-form" editor provides maximum ease of use. Everything you do appears immediately on the screen in front of you. Commands require only a single key or a single key plus CLEAR.

> *...truly a state of the art word processor... outstanding in every respect.*
> — The RAINBOW, Jan. 1982

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Telewriter-64 costs $49.95 on cassette, $59.95 on disk, and comes complete with over 70 pages of well-written documentation. (The step-by-step tutorial will have your writing with Telewriter-64 in a matter of minutes.)

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RAINBOW
CERTIFICATION
SEAL

The conversion to “slick” pages also began the biggest period of growth in THE RAINBOW's history. We went from 15,000 paid circulation to just short of 50,000 in less than a year. Now, we hover between 70,000 and 80,000 a month.

It was somewhere around this time that Senior arrived on the scene and, seeing all this growth, looked for some other computer magazines to print. They did one, briefly, but that was all. Still, Senior read a lot of computer magazines for quite some time.

Therefore, I thought it was pretty interesting when he told me the other day that he thinks he understands why THE RAINBOW (and its sister publications) has prospered in a market where others seem to fall by the wayside right and left.

“It really isn't like a computer magazine at all,” Senior said. “It's more like a catalog. It has bright colors, interesting ads, things for people to do. It's so different from most of the computer magazines I've read that it almost *isn't* a computer magazine. It's something else entirely.”

> ***“We're all something special, we Color Computer people. And our computer is special, too.”***

I just smiled. Senior doesn't have a computer to call his own (I've been working on it, though), so he can't really understand. But what it is is the CoCo Community. We're all something special, we Color Computer people. And our computer is special, too. After all, do you know anyone who *loves* his or her IBM PC? I don't.

With some measure of apologies to the many people whose allegiance to CoCo is shared with their following of the New England Patriots, we CoCo people are a lot like the Chicago Bears — we're the “Grabowskis” of the computer world. But just look what the Grabowskis can do — with our computer or with our football team!

No, I do not expect that we'll ever have a ticker tape parade through downtown Ft. Worth. But maybe we should.

We shut out Commodore in the first round of the play-offs, did the same to Atari in the second and have pretty well smeared Apple, too, although they did score a couple of times.

I don't know if the Bears are starting on a dynasty, but the CoCo is certainly well down that road.

Bear down, CoCo! CoCo forever!

— Lonnie Falk

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TOP RATINGS
HOT COCO MAGAZINE
SEPTEMBER 1984 AND MAY 1985

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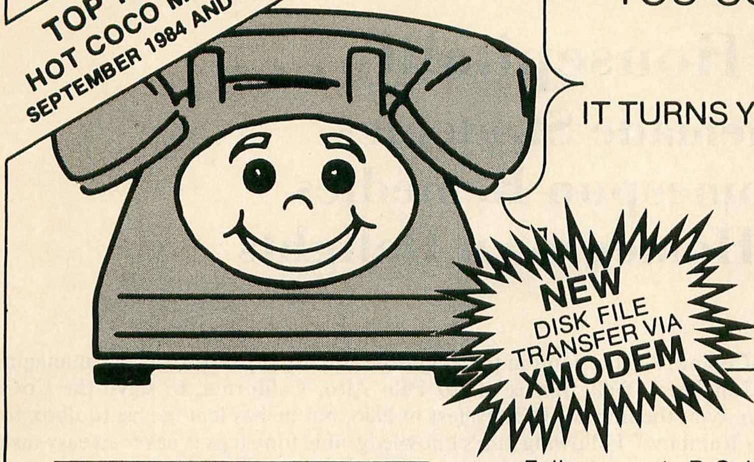

GOOD LOOKIN'

AUTOTERM shows true upper/lower case in screen widths of 32, 40, 42, 51, or 64 characters with no split words. The width of 32 has extra large letters. Scrolling is forward, backward, and fast. Block graphics pictures are displayed automatically and can be scrolled.

The screen's top line shows operating mode, unused memory size, memory on/off, and caps-lock on/off. It also gives helpful prompts.

SWEET TALKIN'

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BUILDING APRIL'S RAINBOW

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Hello, CoColand! At this point in the magazine you usually hear from our managing editor, Jim Reed. Well, Jim is off to Palo Alto, California, to serve the CoCo Community at the first RAINBOWfest of 1986, but he has lent me his toolbox for "Building April's Rainbow." Following Jim's knowledgeable footsteps is never an easy task, but I delighted in the opportunity to introduce you to our new Home Help issue.

Over the past several years we have tried to meet the needs of all areas of our readership. We have had issues focusing on programs and tutorials for the beginner, the programmers and hackers, the hobbyists and gamers, and the students and educators. To welcome the rapidly growing home organizer segment of our readership, we have been searching for programs specifically for use in the home.

There is no doubt the CoCo can be an extremely useful tool around the house. While appliances and machinery such as the washing machine, vacuum cleaner, power mower and table saw were designed to make jobs around the house much easier, there is still a need for organizing all the other time-consuming chores that go into making a comfortable, well-kept home. With the use of all the specifically designed programs, the CoCo can become a multipurpose household tool to help you organize jobs quickly and efficiently, so there is enough time left over to enjoy all the fun the CoCo also has to offer.

In this special Home Help issue, Dennis Weide will assist you in the tedious task of grocery shopping and menu planning with *Shop List*. And, to help you save money on grocery items and more, Donald Turowski's *Refund-A-File* will keep track of your refund forms and qualifying proofs of purchases (POPs).

For the jack-of-all-trades, Leonard Hyre gives us *The CoCo-Handiman*, a program that will help estimate the cost and amount of material needed to complete those long overdue home decorating projects of painting, wallpaper hanging and paneling, pouring concrete, and laying tiles and carpet. And to beautify those new additions even more, Larry Jones' *Plant Log* provides an easier way to care for your plants by keeping track of the individual requirements of each one.

For the astronomers and science buffs, Ronald Pettus' *Halley86* points us in the right direction for viewing the once-in-a-lifetime event of Halley's Comet. Who knows? If you miss the comet on this go 'round, Ronald's program may help your grandchildren find our celestial visitor when it reappears in the year 2062.

Dennis Anderson's *Electrical Cost Calculator* figures the cost of running individual appliances by breaking down your electric bill to determine the amount of watts used and the length of time the device is on, which could help you find and cut some of the unnecessary costs around the home.

And, if you're interested in saving more money, Bruce Ronald's *IRA Estimator* shows you how funds invested in an IRA or Keogh account can accrue to significant sums over the years. Jerry Whittlesey's *College Expense* customizes a plan to save for your childrens' college education.

When all your "home" work is finally neatly organized, and you're ready for that well-deserved fishing trip, Tommy Crouser offers *Bassmate* to assist you in picking the right lures based on a number of factors and conditions.

However, if just staying home enjoying new and exciting Adventures is more your idea of fun, then you're in for a big treat. Not only does this issue contain many terrific home help programs, but here at last is the announcement of the 20 winners of the Third Annual RAINBOW Adventure Contest! The best bonus for our readers, though, is the listing of the grand prize-winning Adventure, *The CoCo Zone*, by Dr. Bruce Bell, and the 16K Best of Show Winner, *The Maze of Moycullen*, by Thomas Riley. Both offer hours of entertainment for all of the CoCo users in the household.

With our usual mix of offerings, it's 260 pages all for the CoCo, and all for less than $2.60 per issue at the current subscription rate of $31 per year. That's less than a penny per page! Who else offers so much in one issue just for the Color Computer?

— Jutta Kapfhammer

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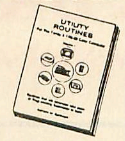

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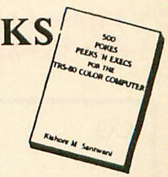
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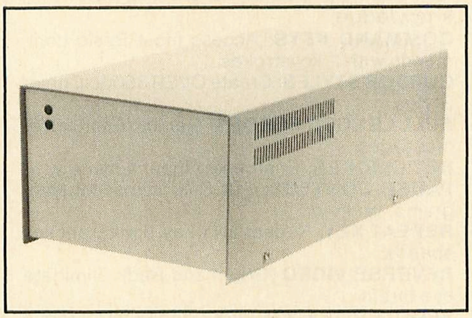

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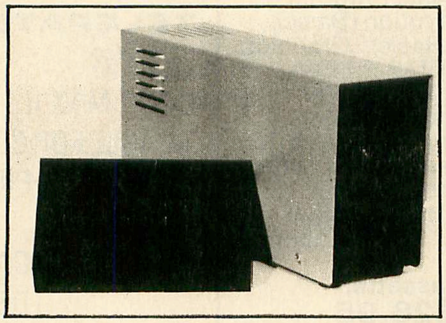

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ADVENTURE CONTEST REPORT

And now, the moment you've been waiting for . . . It's time to announce

OUR TWENTY CARAT GOLD WINNERS

Third Annual Rainbow Adventure Contest

By Jutta Kapfhammer and Philip Helm
Adventure Contest Judges

We've struck it rich! Once again, we've journeyed to the end of the rainbow in search of the elusive pot of gold. And when we found it, we couldn't have been happier, for within it was the vast collection of entries to the Third Annual RAINBOW Adventure Contest. First sight of the shining treasure showed that we were in for something special. We knew that among all the grand Adventures in the pot, there would be enough riches to share with everyone.

For those who do not know, Adventure games are comprised of fictitiously created situations and predicaments that involve fantasy characters, strategic escape tactics and out-of-this-world attempts to gain fortune. The mind-boggling challenges that Adventure games offer provide an escape from the real world, as we soon found after being elected to judge this year's programming competition.

The judging assignment was welcomed with open arms, however, we realized a sacrifice was necessary. Late nights on the town with friends had to be given up. Well, the late nights remained, but the parties weren't with our regular crew of friends — they were with wizards, ghosts, serpents, dwarfs and an endless number of weird characters. And, their idea of a good time included casting spells, setting traps, sending us on wild goose chases, stealing our possessions, and using every deceitful trick imaginable to torment us, often to our death. How could we even think about going to sleep when we were trapped in some continuous maze with something called a "Vanta" hounding our every move?

Of course, the biggest trap we found ourselves in was our sudden addiction to playing Adventure games. After playing only a few, our hunger for more Adventure became so intense that it sometimes won out over our hunger for substantial food. Fast-food bags, pizza delivery boxes, candy bar wrappers and soft drink cans cluttered the room. At one point we even considered naming the upcoming book *The Rainbow Book of Adventures and Junk Food Diet Plan.*

Embarking on the journey in search of the best Adventure entries was a pleasant but difficult experience. As judges, we mixed business with pleasure, working and playing diligently to pick what we think are this year's most mystifying and entertaining Adventures assembled by amateur programmers. Although there were less entries in this year's competition, it didn't take long to realize there were more high-quality programs. With a dramatic increase in the number of new programmers who entered this year's contest, new ground was broken with novel ideas and innovative techniques. Just having a chance to view them first-hand was indeed rewarding.

We again had contestants from all around the globe. Entries were received from all over the United States; from McKinleyville, California, to Manhasset Hills, New York; from Bay City, Michigan, to the Florida Keys. They also arrived from our Mexican and Canadian borders, Brazil, Australia, Puerto Rico and places that had us daydreaming about exotic vacations. We heard from programmers from all walks of life, including doctors, mothers, farmers, white collar and blue collar workers, and many young students. A fiction writer and an actor also got in on the act. It simply demonstrates that with the proper skills, Adventure programming is a hobby that almost anyone can enjoy.

It was plain to see from the beginning that the judging of so many excellent programs would not be an easy task. From just opening the packages, some of the entries had us intrigued even before turning on the computer. With so many nicely written articles, accompanied by excellent art, intricate maps and step-by-step solutions, good impressions were made immediately.

Knowing that each contest unveils new dimensions in programming, there was a sense of anticipation with each and every entry we reviewed. We found many improvements over last year's winners that immensely enhance the involvement of playing Adventure games.

Once again, the graphics entries highlighted the contest. Because there were so many really good graphics programs, there are more graphics winners than in the previous contests. Even a majority of the text Adventures include brilliant graphics title screens. We thoroughly enjoyed the vivid scenes portrayed throughout the graphics Adventures.

The dialogue used in the Adventures is stimulated by the use of some new command concepts that are not often seen. One, for instance, uses a graphics display of the available commands, which are chosen using the joystick and a code letter on the keyboard. In others, sophisticated parsers are used to translate complex sentences into two-word English key words for the computer to respond. Clever verb commands such as ASK, which allows for two-way communication with characters in the Adventure, and LISTEN, which makes it possible to hear what others in a room are saying, were also offered. All add to the feeling of reality with just a little imagination.

More impressive creativity is shown in some by the use of "subgames" within the Adventure. They range from simulated chess games to number-guessing games to even video arcade-type games. Another program uses a graphics directional map that traces the player's moves. Both features make the games more enjoyable and easier to follow.

As in the past, excellent sound effects and music are used throughout this year's Adventures. And, of course, many more incorporate our favorite features: the HELP command, score tallying, randomized play and the game-save feature. It is important that we continue to see improvements and a wide range of new techniques with every new contest. Hopefully, this and future programming competitions will help broaden the knowledge and the full potential of the Color Computer.

Hundreds of hours were obviously spent by this year's group of winning contestants on their programs. All of them should take great pride in their dedication in creating quality programs that exhibit such sophistication, professionalism and creativity.

Although our generous advertisers have contributed some very nice prizes for the 20 winning Adventure programmers, the recipients of the best award will be you, our readers. That's because, once again, all of the runners-up will be published in an illustrious collection, *The Third Rainbow Book of Adventures*. You're sure to have loads of fun with all the Adventures and, who knows, you may just come up with a few terrific ideas of your own for THE RAINBOW's next programming competition.

We take great pleasure in presenting the following awards to the 20 finalists in the Third Annual RAINBOW Adventure Contest:

Honorable Mention goes to William Smit, a 12-year-old from St. Johns, Newfoundland, for his inviting program entry, *Let Me Out O' Here*. The name says it all for this one-room Adventure since the objective is to get out. Several creative verbs are used and many objects must be retrieved to aid the escape.

Honorable Mention goes to Danny De Busk of New Tazewell, Tennessee, for his graphics entry, *Mr. Dead*. Given 10 different suspects, 10 possible murder weapons and 10 potential rooms where the killing may have taken place, a murder mystery must be solved through a series of deductions. Although not an Adventure in the true sense, the delightful graphics and fun in playing it make it quite worthy of recognition.

The Best Mini Adventure Award goes to Matt Hazard, a 14-year-old from Columbia Station, Ohio, for his graphics beginner Adventure, *Escape*. The totally joystick-controlled game involves only four rooms, but a cloistral surprise awaits those who make it to the end.

The Magic Sparkler Award goes to Don Sheerin of Phoenix, Arizona, for *Amulet*. Don, a building inspector, did a top-notch job of constructing his entry, and his fine work could not be overlooked by the judges. Finding the five hidden gems and the amulet among the dozens of objects throughout the 24-room mansion provides endless fun.

The Back-to-the-Future Trophy is awarded to 16-year-old Jason Hunter Dolinsky of Manhasset Hills, New York, for *The Time Machine*. His Adventure relives history through three different time zones: two in the past and one in the future. The entire journey must be completed in two hours and the time is displayed on the screen. That is, of course, as long as the wristwatch is in the possession of the traveler. A clever LISTEN command is offered and sometimes comes in handy when others are in the room talking. Jason's remarkable invention of *The Time Machine* captures the feeling of the creation of history.

The 16K Best of Show is awarded to Thomas E. Riley of Johnsonville, New York, for *The Maze of Moycullen*, an entertaining beginner Adventure, which begins on Page 58 of this issue. Thomas did a fine job of utilizing low resolution graphics by showing a bird's-eye view of an occupied room, and with the text display of all pertinent information (verb list, inventory, directions) also on the screen, makes it easy to understand and a delight to play. Even the youngest of Adventurers can enjoy this one, as all commands selected are entered simply by pressing a single key.

The 16K Runner-Up is awarded to Mike Shay of Lebanon, Pennsylvania, for *Ghost Town*, one of the shortest programs among this year's entries. Drinking is crucial to continuing the Adventure and you can wander for hundreds of moves discovering all sorts of fun things. Or, you can solve the game in only 31 moves, if the clever and tricky hints that Mike provides are used wisely.

The First Aid Award goes to Joab C. Jackson of Owings Mills, Maryland, for his graphics entry, *Balm*. This exciting program provides relief for those who have been brutalized by other Adventure games and seek revenge. Joab, with unsparing assistance from Barbara Jackson, has created a most unusual and interesting theme. The player becomes the Adventure with the task of stopping eight invaders with traps placed throughout the game. The eight invaders all seek a disk that holds the secret to the ultimate question and you must protect it.

The Hard-Nut-to-Crack Award goes to Franklin Marrs, a fiction writer from Columbia, Missouri, for his mysterious Adventure, *The Professional*. Franklin has compounded the already difficult task of returning a client's stolen jade necklace by creating a random Adventure that hides it in one of five locations. He has also incorporated an ASK command, which allows the private detective to request clues from people he meets during his rendezvous. It's a mind-boggling Adventure that demands playing again and again.

The Ghost Busters Award goes to Jon Blow of San Diego, California, for *The Escape of Embroilment*. It is definitely the most difficult Adventure of this year's entries. An excellent assembly of exciting features makes it as enjoyable as any. Since Jon offers three video games and a slot machine, different-colored ghosts that scatter inventory, and a gun with different and unknown settings for zapping each of the multi-colored threats, his game should keep you busy and frustrated for a long time.

The Maze Amazes Award goes to Curtis Keisler, a high school senior from Barnwell, South Carolina. His graphics entry, *The Evil Crypt*, is probably the most unique Adventure among this year's contestants. There are three levels in the cryptic maze, the doldrums, the catacombs and the dungeons, with enough action in each to keep you Adventuring for quite some time. Stairways must be found to travel between levels. The graphically displayed por-

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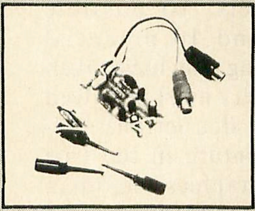

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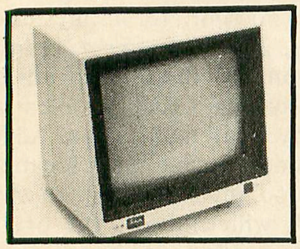

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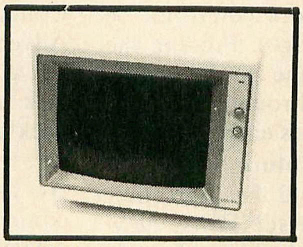

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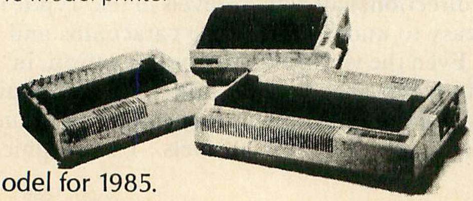

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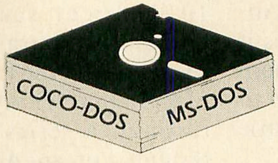

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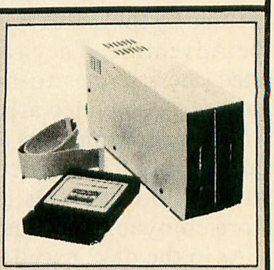

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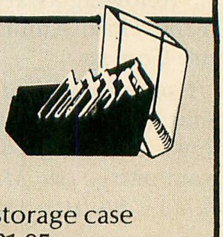

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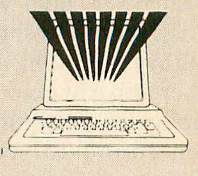

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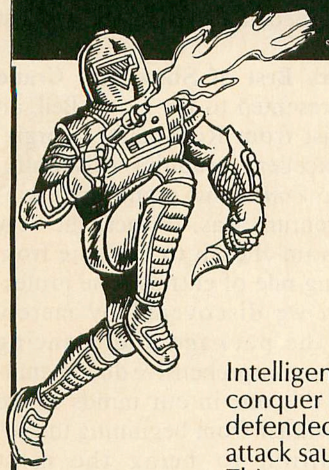

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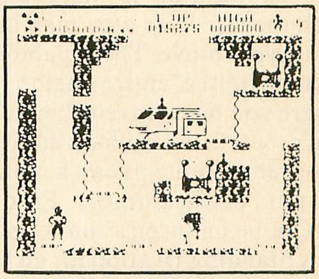

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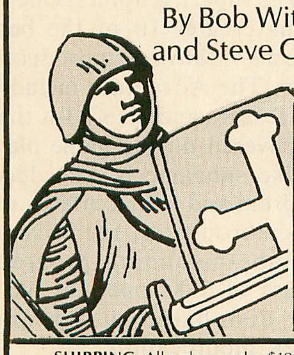

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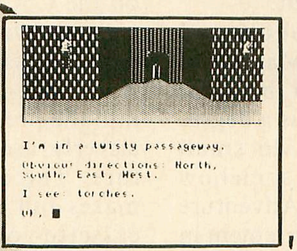

```
I'm in a twisty passageway.

Obvious directions: North,
South, East, West.

I see: torches.

W, ■
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tion of the maze that shows exactly where you are at the time is very nicely done and gives just enough direction to keep you moving using the four arrow keys. However, there is a lot of ground to cover and plenty of treacherous obstacles and hidden dangers to view as you approach them. There are also magical objects to be found, many essential in killing the Evil Lord who dwells within.

The No Nukes Award is presented to Scott McCleary of Palmyra, Pennsylvania, for his graphics entry, *Spymaster.* The graphics presented in the Adventure rated very high with the judges. Not only is each room shown, but the entire inventory is graphically displayed in a most creative manner across the bottom of the screen at all times. Beeping tones, which sound for each letter of the scrolling text and the input commands, add another nice effect to this exciting search for the stolen nuclear weapons.

The (G)Rand-McNally Award is presented to Fred D. Provoncha of Lynbrook, New York, for his innovative Adventure, *Aandark.* This great planetary exploration is made even better with the use of an area map that tracks your every move. The capability to view a map of the entire region, showing where you have traveled and where you can proceed, is a brilliant addition to the program. Being from a young, self-taught programmer, Fred's entry should be an inspiration to many.

A Standing Ovation for an Outstanding Performance is given to Walt Thinnes of Ft. Lauderdale, Florida, for his original entry, *The Actor's Nightmare.* A splendid graphics title screen is accompanied by two fine musical selections. The Adventure takes place in a theater and, being an actor and theater technician, Walter did an excellent job on the layout and description. The plot is quite intriguing. As the real star performer, you have 10 minutes or 120 moves to prevent your fickle understudy from going on in your place and ruining your career. There are many obstacles on your way to the stage in the vast, confusing theater. This, combined with the time limit and one logical, but tricky, twist should send even the best of Adventurers to the start of this game several times before it is solved.

The Best Adventure in a Continuing Series goes to Chris McKernan of Mississauga, Ontario, for his most enjoyable graphics entry, *The Sword and the Sorcerer.* It is a four-part journey with each part being linked to the next, making it an Adventure of an Adventure. Chris, who also won an award in the Second Annual RAINBOW Simulation Contest, has again produced some fine graphics and incorporated lots of surprises within the programs. The addition of a ROOM command, used to examine the room for objects, and an ASK command, for obtaining helpful hints from people in the game, are just a few of the reasons this Adventure series was a big hit with the judges.

The Take 'Em Single-Handedly Award goes to Mike Anderson of Tucson, Arizona, for his creation, *The Adventures of Johnny Zero.* With help from his brother, Mark, Mike has programmed a totally graphics Adventure packed full of enticement. It is played entirely with the use of one-letter commands, and movement through the game is done smoothly with single touch responses to its questions. Mike shows good taste with his use of a clue-giving CoCo that is Johnny Zero's companion throughout the Adventure. But of course, what spy would be caught dead without one?

The Non-Graphics Runner-Up Award goes to Philip Newton, a 15-year-old honor roll student from Cleveland, Tennessee, for *The Adventure of Cleopatra's Pyramid.* The game includes 36 verbs and accepts full sentences and multiple commands (up to three in one entry). It is a classic Adventure through deserts and pyramids that captures the realism of "being there." You have to eat and drink, and fight off scorpions, cobras and deadly crocodiles, all of which move about as you are playing. You are also constantly pestered by a wandering mummy, who will steal your possessions and hide them throughout the catacombs. And, if that's not enough, you stand the risk of being stranded in the desert forever if you don't complete the quest in five days. It all adds up to a sophisticated and challenging Adventure that provides spine-tingling excitement.

Non-Graphics Best of Show and Third Place goes to Ann B. Mayeux of Key West, Florida, for her brilliant entry, *Time Travelers.* She has a degree in psychology, and with two small children to care for, Ann somehow found the time to create an Adventure that offers seven times the excitement in one. As a time traveler, you have the option of choosing any one of seven historical places in which to travel. There are fantastic treasures and many dangers awaiting those who trek into the age of dinosaurs, King Arthur's Camelot, El Dorado, Ancient Rome, Sherlock Holmes' England, the roaring '20s and even the future. The success of the treasure hunting in time determines your standard of living when you return to the present. If your collection is incomplete, life in a lowly New York City tenement could be your just reward.

Graphics Runner-Up and Second Place is awarded to Carlos Eduardo Rocha of Belo Horizonte, Brazil, for his entry, *Iconia.* Carlos' all-graphics Adventure uses the four arrow keys for traveling and incorporates a clever use of symbols, or icons, for commands. The eight icons, always graphically displayed on the screen, are used to: open doors, get or leave objects, look at or use objects, push buttons, show an inventory or finish the mission. A joystick must be used to operate the icons, making it the most original utilization of commands in this year's competition. And, with creatures that run around scattering the objects already obtained, it also is one of the most difficult.

Graphics Best of Show and Grand Prize is presented to Dr. Bruce Bell, an optometrist from Rockmart, Georgia, for his excellent graphics Adventure, *The CoCo Zone.* This grand-prize winning Adventure was, in fact, the very first program chosen to evaluate from the heaping pile of entries. The professionalism we discovered by merely opening the package and glancing through the comprehensive documentation kept this one in our minds as the graphics winner from beginning to end.

In addition to being the most professional-looking, well-organized entry, *CoCo Zone* is packed full of outstanding features. Three BASIC programs, which include machine language subroutines, make up this quality Adventure with its superb graphics. One of the programs creates 10 of the best graphics screens we have seen produced on the CoCo. The Adventure includes a game-save feature and a verb list that must be discovered during game play. An arcade-like subgame is embedded into the program and sound effects are cleverly used throughout the Adventure. The smooth-running program makes full use of 64K, operates on a cassette- or disk-based system and includes a 32K modification.

The judges' decision was unanimous in choosing *CoCo Zone* as the very best! Our hats off to Dr. Bruce Bell for his magnificent winning Adventure, which appears on the following pages. ☐

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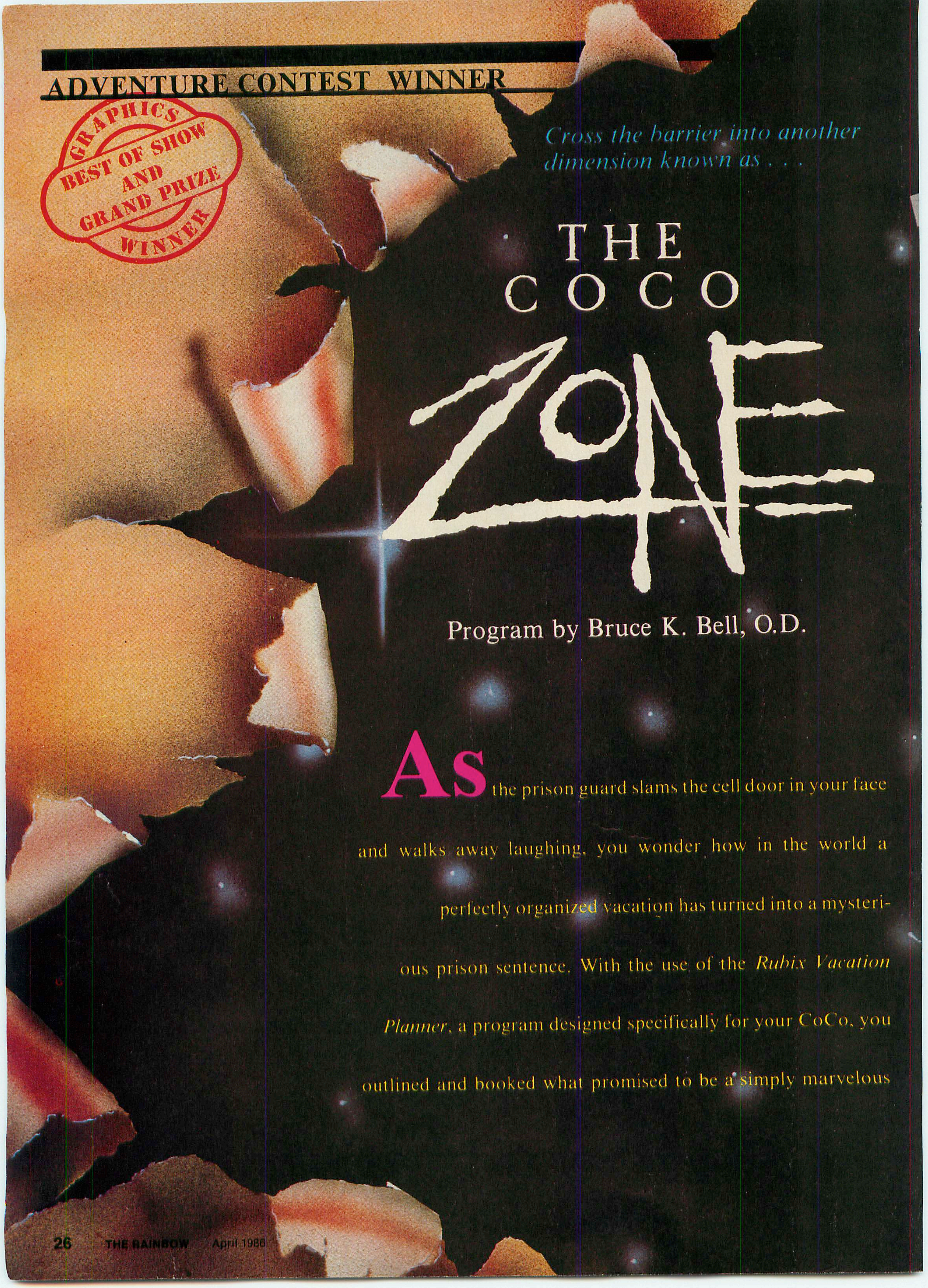

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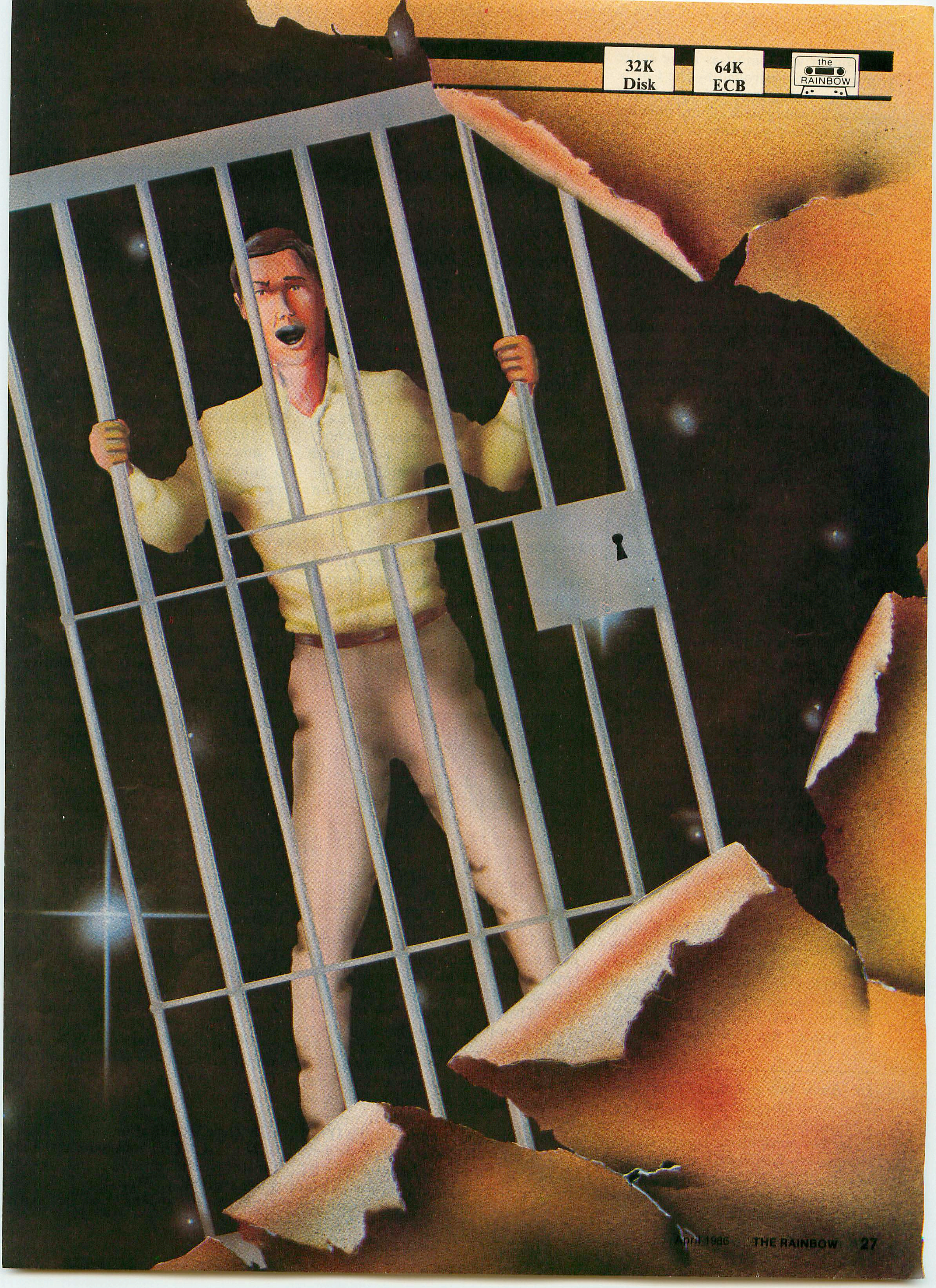
THE COCO ZONE

Program by Bruce K. Bell, O.D.

As the prison guard slams the cell door in your face and walks away laughing, you wonder how in the world a perfectly organized vacation has turned into a mysterious prison sentence. With the use of the *Rubix Vacation Planner*, a program designed specifically for your CoCo, you outlined and booked what promised to be a simply marvelous



32K Disk

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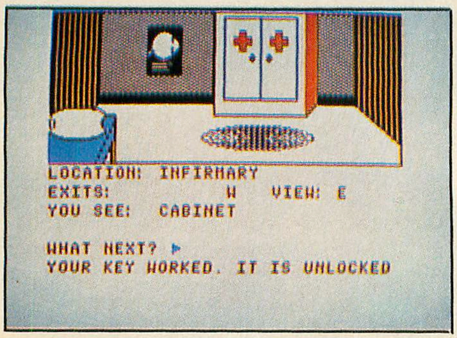
vacation. It was almost as if the entire *trip* would be controlled by the CoCo. But since being arrested and found guilty of a crime you could not possibly have committed, you have to wonder if your program was somehow sabotaged.

Not long after reaching your destination, the news of the disappearance of the infamous African jewel was made public. The most magnificent and mystifying of all stones was on a touring exhibition, but was stolen before making it to the museum. However, the local police announced they had a suspect in mind and felt they would have the dastardly criminal behind bars before the end of the day.

Sacrificing your curious preoccupation with the African jewel incident to resume the vacation, you packed your backpack for an afternoon of sightseeing and some off-the-beaten-path exploring. However, before making your exit, a troop of uniformed officers bolted through the door of the beach hut, handcuffed you and provided an escort to the city's Hall of Justice. Although never resisting, you were literally dragged into the courtroom. With no booking, no processing and without making one comment in your defense, you were found guilty of stealing the African jewel. The result of the mock trial: a sentencing of imprisonment for an undetermined amount of time.



```
LOCATION: INFIRMARY
EXITS:          W     VIEW: E
YOU SEE:   CABINET

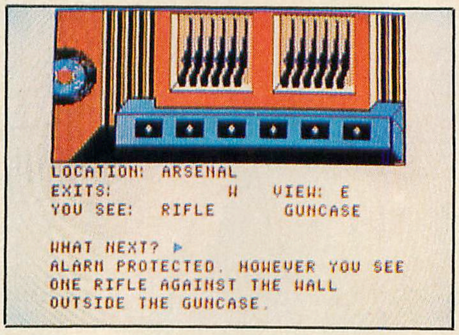
WHAT NEXT? ▶
YOUR KEY WORKED. IT IS UNLOCKED
```

You must have been framed. Could the *Rubix Vacation Planner* have something to do with this mess? You know you could prove your innocence in a fair trial, but not hopelessly stuck behind bars. Your imagination ponders escape. Fat chance! But suddenly, a nervous-looking guard approaches delivering a tray of food. The meal looks less than appetizing. As you lift the napkin to wipe the perspiration from your brow, a note falls to the floor. The guard dashes away. You can disregard the note and dream of being rescued, or pay heed to it, which could lead you on an Adventure through another dimension known as . . . *The CoCo Zone.*

> ***". . . you were found guilty of stealing the African jewel. The result of the mock trial: a sentencing of imprisonment for an undetermined amount of time."***

Loading Instructions

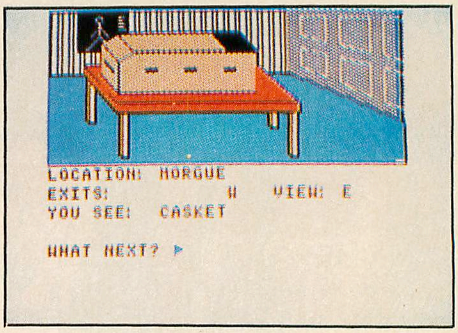
The CoCo Zone Adventure requires 64K Extended Color BASIC and consists of three BASIC programs: *CoCo Draw, Boot* and *CoCo Zone.* Some of *CoCo Draw*'s subroutines (lines 1-25) are taken from Fred Scerbo's "Wishing Well" program, *Seven More PMODE4 Colors* (THE RAINBOW, January 1985, Page 32), and were used by express permission. The *CoCo Draw* program creates and saves the 10 graphics screens that are used in the game. The screens are loaded in the upper 32K of a 64K Color Computer. *Boot* loads the machine language routines and the 10 graphics screens created by *CoCo Draw. CoCo Zone* is the actual game, which is also loaded and executed by *Boot.*



```
LOCATION: ARSENAL
EXITS:           W     VIEW: E
YOU SEE:   RIFLE        GUNCASE

WHAT NEXT? ▶
ALARM PROTECTED. HOWEVER YOU SEE
ONE RIFLE AGAINST THE WALL
OUTSIDE THE GUNCASE.
```

Carefully type in *Boot* (Listing 1) and save a copy on either cassette or disk. If you are saving on cassette, the disk controller must be unplugged (if you plan to also RUN *CoCo Zone* with the controller unplugged) due to the different address of graphics video memory on a non-disk system. Then, type in *CoCo Draw* (Listing 2) and save a copy. If you are saving on cassette, you may wish to CSAVE"COCODRAW" on a separate tape; it may be stored away since it is not needed for actual game play. You must also return the same cassette — which you saved earlier as *Boot* (Listing 1) — to the cassette recorder. Returning the same cassette enables you to save the 10 graphics screens created by *CoCo Draw*, following the *Boot* program.



```
LOCATION: MORGUE
EXITS:          W     VIEW: E
YOU SEE:   CASKET

WHAT NEXT? ▶
```

Now, RUN *CoCo Draw* and a colored screen appears. If it is red, press ENTER to continue. If the screen is blue, press Reset and RUN the program again until the screen is red. After the color test, you are asked if you wish to observe the graphics screens while they are being drawn. Though this will spoil some of the Adventure's mystery, it allows you to spot any obvious typing mistakes before playing the game. The choice is up to you, but the process is quite time-consuming, especially for cassette. If you choose not to see the scenes being created, a message informs you of the program's progress.

After *CoCo Draw*'s creating and saving process is complete your cassette or disk should contain 11 files: the *Boot* program and the graphics screens *Zone 0* through *Zone 9.* It is particularly important that the 11 programs are saved on the cassette in this order. The final step of game preparation is to type in and save the actual *CoCo Zone* game (Listing 3) following *Zone 9* on your cassette or disk.

You are now ready to play *The CoCo Zone* Adventure. Simply CLOAD or LOAD"BOOT" and RUN. However, on cassette systems, after running *Boot* you must also ENTER RUN at the OK prompt. The color test appears and game play will begin.

32K Disk Modification

The CoCo Zone uses bank switching for storage and retrieval of many of the game's graphics. However, in a 32K computer, the upper 32K of memory is

---

Dr. Bruce Bell practices optometry in Rockmart, Georgia, and uses his CoCo extensively in both his home and business. He particularly enjoys teaching learning-disabled children with visual problems. Dr. Bell has also written and published Arcade Games in BASIC for the Color Computer.

not available, therefore, the program cannot be loaded in its entirety. In order to reserve enough memory, save (by running *CoCo Draw*) *Zone 0* through *Zone 9* on your game disk and make the following changes to listings 1 and 3.

On the *Boot* program, Listing 1:

- `DEL`ete lines 6-9, 12-13 and 30-31.
- Replace Line 5 with `5 FOR K=1TO 2000:NEXT`
- Replace `EXEC32714` in Line 32 with `LOADM"ZONE 9.PIC"`

On *CoCo Zone*, Listing 3:

- Replace `EXEC32714` in Line 138 with `GOSUB187:LOADM"ZONE"+STR$(X-1)+"/PIC":EXEC32211`
- Replace `POKE491,10:EXEC32714` in lines 179 and 184 with `GOSUB 187:LOADM"ZONE 9.PIC":EXEC32211`

CoCo Zone's graphics screens will now be called from the disk drive individually, allowing it to be played on a 32K disk system.

Hints on Playing the Adventure

Since *CoCo Zone* contains a true directional map, tracing your moves can be extremely helpful. One-letter directional commands can be used (N, S, E and W) and you can always `LOOK` in any of the four directions (e.g., LOOK NORTH). Two-word commands are used: a verb followed by a noun. The first three letters of each verb and the first four letters of each noun can be used as abbreviation if desired to speed game play.

The program keeps track of the number of command entries made. Each command is referred to as a move, and by typing `SCORE`, the number of moves made at that point is revealed. However, entering `SCORE` does not count as a move.

In case the BREAK key is inadvertently pressed during game play, the Hi-Res screen will not be affected. By entering `GOTO 4`, the screen is cleared and play may resume by typing `LOOK` at the WHAT NEXT? prompt. You may also quit playing at any point by entering `QUIT`. Then, when prompted with ARE YOU SURE?, enter `YES`, or just 'Y'. The program performs a cold start and will be erased from memory.

You may save and retrieve your game at any stage if desired. To save a game, enter `SAVE` and you are asked if the save is to disk or cassette. Entering 'D' or 'C' initiates a disk or cassette save, respectively. Entering 'A' aborts the procedure. Before responding, however, prepare your disk or cassette for saving.

To load a saved game, enter `LOAD`. Again you are prompted for disk or cassette (or abort). Prepare your disk or cassette and press the appropriate letter, 'D', 'C' or 'A'. Press ENTER and after loading, the game resumes at the point at which you saved the Adventure.

The challenge of *CoCo Zone* is not only to prove your innocence, but to do so in as few moves as possible. But you must remember, once you enter the *CoCo Zone*, trying to exit could result in death. Unless, of course, you are able to make the right moves at precisely the right time. However, as Dr. Bell might also remind you, don't bury yourself in the *CoCo Zone* without an escape plan!

(Questions regarding *CoCo Zone* may be directed to Dr. Bell at 137 Samanda Circle, Rockmart, GA 30153. Please include an SASE when writing.) ☐

— Jutta Kapfhammer and Philip Helm
Adventure Contest Judges

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```
9.........60
18 ........74
25 .......159
END .....141
```

Listing 1: BOOT

```
0 'COCO ZONE BOOT 1.0, (C) 1985
BRUCE BELL
1 PMODE4,1:POKE179,2:PCLS:SCREEN
1,1:IFINKEY$=""THEN1
2 CLEAR200,32210:CLS:PRINT"COCO
ZONE (BOOT) 1.0","(C) 1985 BRUCE
 K. BELL":PRINT:INPUT"cASSETTE O
R dISK";CD$:IFCD$<>"C"ANDCD$<>"D
"THEN2
3 CLS:PRINTSTRING$(32,124);
4 PRINT"YOU ARE SEATED IN A DING
Y COURT-ROOM, ENDURING HEAT SO S
TIFLING THAT NOT EVEN THE FLIES
HAVE    BOTHERED TO DROP IN. YOU
 HAVE    BEEN TRIED FOR THEFT OF
THE     PRICELESS AFRICAN JEWEL
FOR","WHICH YOU KNOW YOU ARE INN
OCENT.
5 FORK=0TO53:READD$:POKE32714+K,
VAL("&H"+D$):NEXT
6 DATA34,37,7F,1,EA,CC,80,1,10,9
E,BC,BE,1,EA,30,1F,27,5,C3,B,FF,
20,F7,1F,1,C3,B
7 DATAFF,FD,7F,FE,A6,A0,1A,50,7F
,FF,DF,A7,80,7F,FF,DE,1C,AF,BC,7
F,FE,26,ED,35,B7,0,0
8 FORK=0TO4:IFCD$="C"THENCLOADM"
ZONE"+STR$(K)ELSELOADM"ZONE"+STR
$(K)+".PIC"
9 POKE491,K+1:EXEC32714:NEXT
10 PRINT"   A MILDLY PLUMP JURY
FOREMAN   SMILES AT A PREOCCUPIED
 JUDGE ASHE STATES A VERDICT OF
GUILTY!  THE JUDGE WINKS AT AN O
VERCONFI-DENT DISTRICT ATTORNEY
AS HE    PRONOUNCES SENTENCE. A
SENTENCE"
11 PRINT"THAT NEITHER HE NOR YOU
 FULLY   COMPREHEND. ONE WHOSE O
NLY      LIMITS ARE THE BARRIERS
 OF THE  IMAGINATION. FOR YOU HA
VE JUST  CROSSED OVER INTO THE..
```

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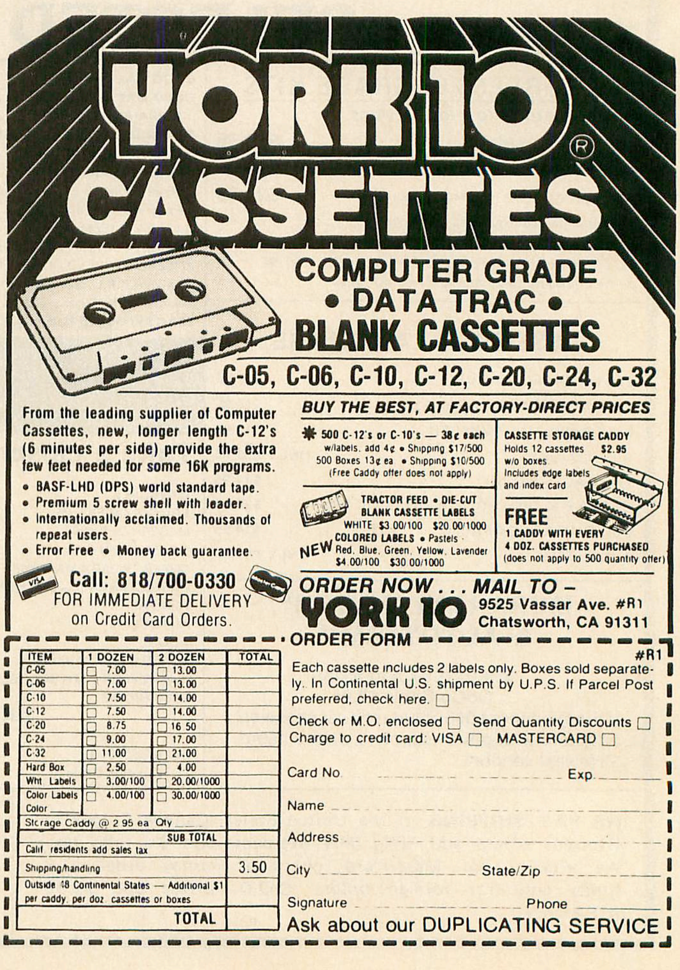

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."
12 FORK=5TO9:IFCD$="C"THENCLOADM
"ZONE"+STR$(K)ELSELOADM"ZONE"+ST
R$(K)+".PIC"
13 POKE491,K+1:EXEC32714:NEXT
14 FORK=0TO502:READD$:POKE32211+
K,VAL("&H"+D$):NEXT
15 DATA30,8D,0,19,BF,1,68,30,8D,
0,76,BF,1,6B,86,7E,B7,1,67,B7,1,
6A,86,39,A7,8C,E5,39,0,34,37,D6,
6F,26,5C
16 DATA1F,2,DC,88,C4,E0,E7,8C,F0
,86,C,3D,DB,89,E0,8C,E8,D3,BC,C3
,0,60,9E,88,8C,5,0,25,3,C3,C,0,1
E,2,81
17 DATAFF,27,16,81,D,27,1A,81,8,
27,16,81,20,27,12,81,2F,2F,A,81,
5B,2C,6,20,A,86,2E,20,6,86,5B,20
,2,86,2F
18 DATA8E,7E,52,80,2D,30,8,4A,26
,FB,C6,8,A6,80,A7,A4,31,A8,20,5A
,26,F6,35,B7,34,37,86,FF,20,9C,F
F,DF,D7,D5,D5
19 DATAD7,DF,FF,FF,FF,FF,FF,FF,F
F,FF,FF,C7,BB,BB,BB,BB,BB,C7,FF,
EF,CF,EF,EF,EF,EF,83,FF,C7,BB,FB
,E7,DF,BF,83,FF
20 DATAC7,BB,FB,E7,FB,BB,C7,FF,B
B,BB,BB,81,FB,FB,FB,FF,83,BF,C7,
FB,FB,BB,C7,FF,C7,BF,BF,A7,9B,BB
,C7,FF,83,FB,F7
21 DATAEF,DF,BF,BF,FF,C7,BB,BB,C
7,BB,BB,C7,FF,C7,BB,BB,C3,FB,FB,
C7,FF,FF,BF,BF,FF,FF,BF,BF,FF,FF
,FF,FF,FF,EF,EF
22 DATADF,BF,F7,EF,DF,BF,DF,EF,F
7,FF,FF,FF,FF,83,FF,FF,FF,FF,BF,
DF,EF,F7,EF,DF,BF,FF,C7,BB,FB,E7
,EF,FF,EF,FF,EF
23 DATACF,AF,EF,EB,E7,EF,FF,EF,D
7,BB,83,BB,BB,BB,FF,87,BB,BB,87,
BB,BB,87,FF,C7,BB,BF,BF,BF,BB,C7
,FF,87,BB,BB,BB
24 DATABB,BB,87,FF,83,BF,BF,87,B
F,BF,83,FF,83,BF,BF,87,BF,BF,BF,
FF,C3,BF,BF,B3,BB,BB,C3,FF,BB,BB
,BB,83,BB,BB,BB
25 DATAFF,83,EF,EF,EF,EF,EF,83,F
F,FB,FB,FB,FB,FB,BB,C7,FF,BB,B7,
AF,9F,AF,B7,BB,FF,BF,BF,BF,BF,BF
,BF,83,FF,BB,93
26 DATAAB,BB,BB,BB,BB,FF,BB,9B,A
B,B3,BB,BB,BB,FF,C7,BB,BB,BB,BB,
BB,C7,FF,87,BB,BB,87,BF,BF,BF,FF
,C7,BB,BB,BB,AB
27 DATAB7,CB,FF,87,BB,BB,87,AF,B
7,BB,FF,C7,BB,BF,C7,FB,BB,C7,FF,
83,EF,EF,EF,EF,EF,EF,FF,BB,BB,BB
,BB,BB,BB,C7,FF
28 DATABB,BB,BB,BB,BB,D7,EF,FF,B
B,BB,BB,BB,AB,93,BB,FF,BB,BB,D7,
EF,D7,BB,BB,FF,BB,BB,D7,EF,EF,EF
,EF,FF,83,FB,F7
29 DATAEF,DF,BF,83,FF,FF,FF,FF,F
F,FF,FF,EF,FF
30 FORK=0TO13:READD$:POKE32745+K
,VAL("&H"+D$):NEXT
31 DATA1A,50,7F,FF,DF,A6,80,7F,F
F,DE,1C,AF,A7,A0
32 PMODE4,1:PCLS0:FORK=1TO100:PS
ET(RND(255),RND(96)+95,5):NEXT:P
OKE491,10:EXEC32714:SCREEN1,1
33 POKE492,PEEK(360):POKE493,PEE
K(361):POKE494,PEEK(363):POKE495
,PEEK(364):'store unmodified ram
 vector
34 IFCD$="C"THENCLOAD"COCOZONE"E
LSELOAD"COCOZONE",R
```

15	170
24	132
33	216
39	3
45	175
50	7
56	140
60	248
64	197
END	12

Listing 2: COCODRAW

```
0 'COCO ZONE (DRAW) 1.0, (C) 198
5 BRUCE K. BELL
1 '******************************
2 '* SEVEN MORE PMODE4 COLORS *
3 '*    BY FRED B. SCERBO      *
4 '* 149 BARBOUR ST.N.ADAMS.MA*
5 '*    COPYRIGHT (C) 1984    *
6 '******************************
7 CLEAR1000:R=3:B=2
8 PMODE4,1:PCLS1:SCREEN1,1:PMODE
3:PCLS3
9 IFINKEY$=CHR$(13)THEN11ELSE9
10 'START COLOR SET
11 CLS0:PMODE4,1:PCLS0:SCREEN1,1
:DIM Y(3),B(3),G(3),S(3),P(3),L(
3),V(3):LINE(32,0)-(48,5),PSET,B
F
12 FORX=31TO47STEP4:PSET(X,0,0):
PSET(X+2,1,0):PSET(X+1,4,0):PSET
(X+3,5,0):NEXT
13 FORX=32TO47STEP8:PSET(X,8):PS
ET(X+4,9):LINE(X,12)-(X+1,12),PS
ET:LINE(X+4,12)-(X+5,12),PSET:LI
NE(X+2,13)-(X+3,13),PSET:LINE(X+
6,13)-(X+7,13),PSET
14 PSET(X,16):PSET(X+1,17):PSET(
X+4,16):PSET(X+5,17):PSET(X+1,20
):PSET(X+5,21):NEXTX:PMODE3:COLO
R2,3:LINE(32,24)-(48,24),PSET:LI
NE(32,25)-(48,25),PRESET
15 PMODE4:GET(32,0)-(47,1),Y,G:G
ET(32,4)-(47,5),B,G:GET(32,8)-(4
7,9),G,G:GET(32,12)-(47,13),S,G:
GET(32,16)-(47,17),P,G:GET(32,20
)-(47,21),L,G:GET(32,24)-(47,25)
,V,G
16 GOTO26:'PAINTING ROUTINES
17 LC=VAL(MID$(PT$,2,3)):TC=VAL(
MID$(PT$,6,3)):RC=VAL(MID$(PT$,1
0,3)):BC=VAL(MID$(PT$,14,3))
18 XX$=LEFT$(PT$,1):IFXX$="Y"THE
N19ELSEIFXX$="B"THEN20ELSEIFXX$=
"G"THEN21ELSEIFXX$="S"THEN22ELSE
IFXX$="P"THEN23ELSEIFXX$="L"THEN
24ELSEIFXX$="V"THEN25ELSERETURN
19 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),Y,OR:NEXTZZ,YY:RETURN
20 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),B,OR:NEXTZZ,YY:RETURN
21 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),G,OR:NEXTZZ,YY:RETURN
22 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),S,OR:NEXTZZ,YY:RETURN
23 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),P,OR:NEXTZZ,YY:RETURN
24 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),L,OR:NEXTZZ,YY:RETURN
25 FORYY=TC TO BC STEP2:FORZZ=LC
 TO RC STEP16:PUT(ZZ,YY)-(ZZ+15,
YY+1),V,OR:NEXTZZ,YY:RETURN
26 CLS:PRINT"COCO ZONE DRAW 1.0"
,"(C) 1985 BRUCE K. BELL",,,,,:I
NPUT"cASSETTE OR dISK OPERATION"
;Q$:IFQ$<>"C"ANDQ$<>"D"THEN26
27 PRINT:INPUT"DO YOU WISH TO VI
EW THE PICTURESAS THEY ARE DRAWN
 (Y/N)";I$:IFI$="Y"THENSCREEN1,1
28 FORA=0TO9:IFI$<>"Y"THENPRINT@
352,"DRAWING PICTURE #"A
29 PCLS5:DRAW"BM0,0C0R255D96L255
U96":ONA+1GOSUB32,37,40,45,50,55
,60,65,68,71:F$="ZONE"+STR$(A):I
FQ$="C"THEN30ELSEVERIFYON:SAVEMF
$+".PIC",3584,6656,380:GOTO31
30 PK=PEEK(188)*256+PEEK(189):CS
AVEM F$,PK,PK+3072,380
31 NEXTA:PRINT@384,"JOB COMPLETE
D":END
32 DRAW"BM255,96C0H10L200U20R100
BR3R97ND20F6BF2F2U20G2BG2G6BE10L
20NU90G6NU96L154NU96BE10NE6U50R6
ND44R54D44NL54D6L60BR74NE6U50R6N
D44R54D44NL54D6L60":PAINT(96,4),
0,0:PAINT(170,4),0,0
33 PT$="Y092,003-148,046":GOSUB1
7:PT$="Y166,003-220,046":GOSUB17
:DRAW"BL14NU50BR74NU50BR10NU50BL
70BD4BL84L20G10D8L10NU90G22":POK
E178,2:PAINT(80,4),,0:POKE178,1:
PAINT(128,70),,0
34 FORK=60TO210STEP30:LINE(K,70)
-(K+20,80),PRESET,BF:CIRCLE(K+10
,75),2,5:NEXT:PAINT(128,94),0,0:
FORK=0TO2:POKE178,K:FORX=1TO8:CI
RCLE(8,42),(3-K)*8-X,,.8:NEXTX,K
:PAINT(2,2),,0:POKE178,124:PAINT
(254,4),,0:PAINT(40,4),,0
35 G$="C0U3LD3LU3LD3LU6ED4RU6ED7
RU16G2D2F2U8RD14EU22ED20EU30LD10
":FORK=96TO136STEP8:X=K+74:DRAW"
BM=K;,48XG$;BM=X;,48XG$;":NEXT
36 RETURN
37 LINE(15,0)-(239,75),PSET,BF:P
T$="Y016,000-239,073":GOSUB17:FO
RX=24TO239STEP24:FORY=10TO40STEP
30:POKE178,2:LINE(X,Y)-(X+16,Y+2
2),PSET,BF:CIRCLE(X+4,Y+10),2,0:
NEXTY,X
38 DRAW"BM239,0C0D75F15BL255E15"
:CIRCLE(128,95),50,0,.2,.5,1:POK
E178,1:PAINT(128,90),,0:PAINT(50
,90),0,0:PT$="S000,075-255,095":
GOSUB17:DRAW"G15BR255H15":POKE17
8,212:PAINT(2,2),,0:PAINT(250,2)
,,0
39 RETURN
40 DRAW"BM255,83C0M-34,-25NU58L2
8NU58G8NU66L66U8NU58L84NU58G4BM1
26,4R52D52L26NU52L26U52BD17BR7U4
R4U4R4D4R4D4L4D4L4U4L4BR26U4R4U4
R4D4R4D4L4D4L4U4L4":POKE178,2:PA
INT(139,18),,0:PAINT(165,18),,0:
PAINT(190,2),,0:CIRCLE(146,30),2
,0:CIRCLE(158,30),2,0
41 PAINT(100,4),0,0:PAINT(200,4)
,0,0:PT$="S022,001-110,052":GOSU
B17:PT$="S194,001-216,052":GOSUB
17:FORK=5TO40STEP5:CIRCLE(150,80
),K,0,.2:NEXT:PT$="P111,072-190,
088":GOSUB17
42 CIRCLE(20,66),20,0,.3,.5,1:CI
RCLE(20,76),20,0,.3,1,.5:CIRCLE(
40,71),4,0,1.3,.25,.75:CIRCLE(0,
71),4,,1.3,.75,.25:DRAW"BM40,66C
0R6FND10M-14,+29R6M+8,-18D18L2NU
12LU10"
```

```
43 LINE(70,10)-(95,40),PSET,BF:C
IRCLE(82,22),9,5,1,.1,.9:CIRCLE(
88,22),5,5,1,.8,.2:PAINT(82,25),
5,5:DRAW"BM75,22C5G4D2E6C0BR11BU
2U4BD8D4C5BD5L14BD2R10BF2L12"
44 POKE178,1:PAINT(2,94),,0:PAIN
T(39,94),,0:POKE178,104:PAINT(2,
2),,0:PAINT(254,2),,0:RETURN
45 DRAW"BM255,70C0M-84,-30NU40":
PAINT(200,20),0,0:PT$="S171,000-
256,70":GOSUB17:DRAW"L12R2BF18D6
L2D28L4NU28H2U26L8D10L4NU10H2U8R
18L126R2D26F2NU28R4U28L8U6R40BR3
R85BL128H24D6NF24F2D26F2NU26R4U2
2H8U6R12NU14D6F12R100U18NM+30,+2
4U08H12L88M-11,+6"
46 PAINT(128,40),0,0:PT$="Y038,0
14-134,051":GOSUB17:DRAW"M+11,-6
R88F12ND26L20NH12L68NH12M-11,+6N
H12D20H12BL14L24BR40BU08F6UH6BR3
0BD6R8DL8BR28R8UL8BR28R8DL8":PAI
NT(136,20),0,0
47 POKE178,2:PAINT(128,55),,0:PO
KE178,1:PAINT(2,90),,0:DRAW"BM18
0,4C5D12M+18,+4U16L18BD20M+18,+4
D14M-18,-6U12BM+28,+6M+22,+4D20M
-22,-8U16BU8M+22,+4U22L22D18BM+3
2,+6U24R16D28M-14,-4BD8M+14,+4D2
2M-15,-4U22":PAINT(128,55),,0
48 POKE178,1:PAINT(2,90),,0:DRAW
"BM180,4C5D12M+18,+4U16BM20,0C0D
25R16BE12BR8U12":PAINT(22,2),0,0
:DRAW"C5BG2L4BD2R2BF2L4BD2R3BF2L
5BG8BL2H4G8NL2E8U6NF6NG6U2LH2UER
3FDG2":POKE178,201:PAINT(2,2),,0
:PAINT(170,2),,0
49 RETURN
50 DRAW"BM188,95U26NR66":PAINT(2
48,90),0,0:PT$="Y190,071-254,93"
:GOSUB17:DRAW"M+48,+27L16M-20,-1
2D12":PAINT(204,93),0,0:DRAW"BM1
26,0D60NR128M-104,+33M-22,-8":PA
INT(40,93),0,0:PT$="P000,060-248
,95":GOSUB17
51 DRAW"C0U85R22D91BD2BE11M+88,-
27U10M-88,+18ND18BU10M+88,-15U10
M-88,+5ND20BU10M+88,-3U8M-88,-5N
D15BU6NU12M+88,+4U6":FORK=0TO3:P
OKE178,K*6+31:PAINT(96,K*18+2),,
0:NEXT:POKE178,2:PAINT(4,4),,0
52 LINE(186,5)-(232,60),PSET,BF:
DRAW"BM139,8C0R26D28L26U28F3R20N
E3D22NF3L20NG3U22D14BRE2F4E8F4E"
:POKE178,1:PAINT(146,12),,0:POKE
178,2:PAINT(146,30),,0:CIRCLE(15
0,18),2,5:PT$="Y186,005-232,60":
```

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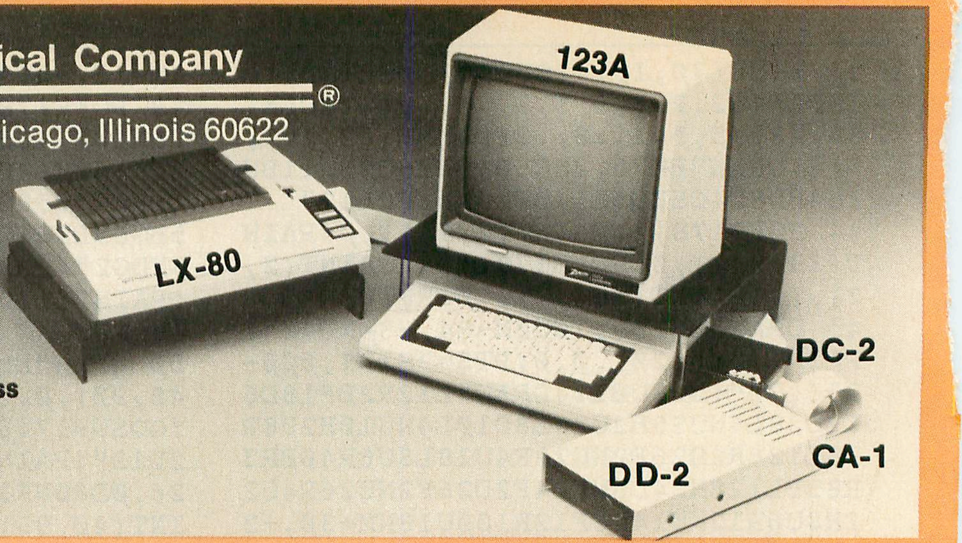

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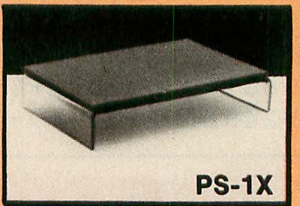

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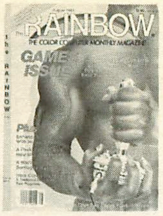

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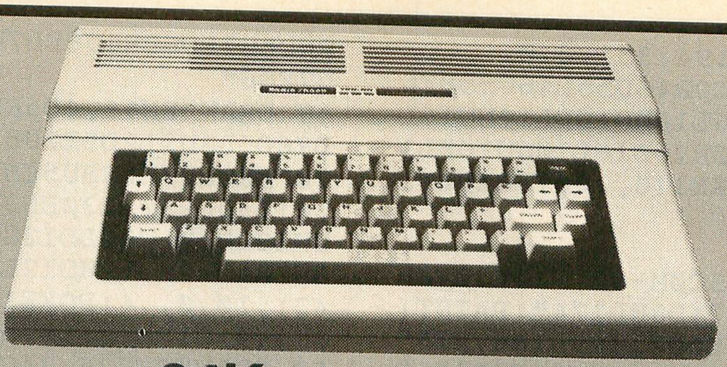

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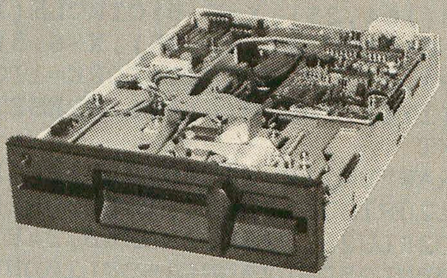

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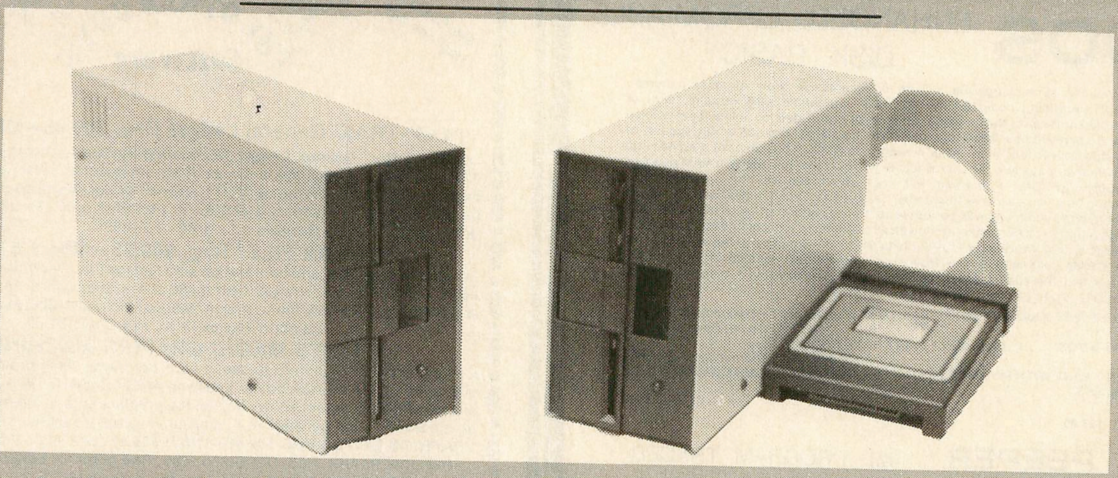

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```
GOSUB17:CIRCLE(194,35),2,0
53 DRAW"BM186,5C0R46D55L46U55BF6
BR2R10BR10R10D16L10NU16BL10NU16L
10U16BD30R10BR10R10D16L10NU16BL1
0NU16L10U16":POKE178,106:PAINT(1
68,4),,0
54 RETURN
55 DRAW"BM240,95C0M-40,-24L30F6H
30NU47L146D30R174D8NL174":PAINT(
4,50),0,0:PT$="Y002,049-166,075"
:GOSUB17:DRAW"U8H6NR8NH24F6D8":P
OKE178,1:PAINT(230,92),,0:DRAW"C
0L3D10L4U10L2D10":POKE178,2:PAIN
T(4,83),,0
56 POKE178,99:PAINT(180,4),,0:FO
RX=4TO144STEP6:FORY=4TO44STEP10:
PRESET(X,Y):NEXTY,X:FORX=6TO12:C
IRCLE(164,25),X-6,5:CIRCLE(164,2
5),X,0:CIRCLE(194,25),X-6,5:CIRC
LE(194,25),X,0:NEXT:FORK=1TO75:X
=RND(174):Y=RND(6)+76:PRESET(X,Y
):NEXT
57 DRAW"BM130,24C0D10LU10R6L12UR
12UL12UR12UL12BM14,13L20UR20UL20
UR20D28LU28LD28LU28BM65,24R30DL3
0DR30DNL25DNL20DNL15DNL10DNL5":C
IRCLE(99,28),4,0:CIRCLE(100,27),
4,0:DRAW"BM30,34U6ED7ND6RU6BR4D6
RND8U7FD6BR4U6ED7ND4RU6BR4D6RND6
U7FD6"
58 DRAW"BM46,4D5R2U5HUD7NL3R3DL6
DR6D5L2U5L2D5L2U5BM110,41C0EL2ED
2U7ER3EU7HL3HU5EHEHEHEHEHEHBM110
,61L30ER30EL30ER30BM72,54U12LD12
GU12GD12LU12LD12GU12LD12LU12LD12
HU12LD12HU12HD12LU12":CIRCLE(65,
42),10,0,.4:POKE178,1:PAINT(65,4
2),,0:CIRCLE(65,50),3
59 DRAW"BM226,34C0M+4,+2D30FU30F
4U12H4M-2,-1G4D6":PAINT(228,28),
0,0:RETURN
60 DRAW"BM255,80U56H20D56F20":PA
INT(252,70),0,0:PT$="Y234,004-25
5,080":GOSUB17:DRAW"U56H20D56F20
H32NU48L40U44M-4,+2D46NE4L36U30N
R36U16NR36M+4,-2NR36BD6D6BD14D8B
D10BL4L20U30NU4G4D29NE4L30U30NR3
0E4NR30U4NR30BF6BL4R6BR10R6BD6BL
4L18D20R18U20"
61 DRAW"BG4L10BG10BD9L20G4U6BU2U
22NL40E4ND30L48NF4NU20M-20,+10D1
8E24D14BD2D14NR40G24BE2BU6U20E8D
20G8BE12U20E6D20NG6BR8BU2U20R14D
20L14BR18U20R14D20L14BM252,70H12
U10F12D10BU16H12U10F12D10BU16H12
U10F12D10"
```

ADOS ENHANCED, EPROM-ABLE DISK BASIC

Now, you can supercharge Basic with an impressive array of extra features WITHOUT sacrificing compatibility! ADOS is compatible with virtually 100% of commercial software. Customizing utilities are provided to allow user-defined command abbreviations, baud rate, step rate, tracks per disk (35 or 40), support of double-sided drives, and more. After customizing ADOS, you can have it burned into an EPROM that plugs into the Disk Basic ROM socket, or just use it in RAM as a 64K disk utility. (EPROM + burning will cost about $20--we provide information concerning how you can have this done.) Features include: • repeat and edit of the last direct-mode command • 26 definable control-key abbreviations • automatic line-number prompts • DOS command • lowercase command entry (a fine complement to a Lowerkit or PBJ WordPak) • COPY (filename) to (drive number) • AE error override option • RAM command (64K) • RUNM command • text echoing to printer • ML monitor • text file scan • enhanced directory • error trapping • hi-res text utility included (42, 51, or 64 characters per line)

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```
62 G$="D10G6F6R2E6H6U10LD10":DRA
W"BL43BU24XG$;BH16XG$;BL117BU10X
G$;BD60NG18R91ND4G16BG2R4E14":PO
KE178,2:PAINT(6,54),,0:PAINT(18,
42),,0:PAINT(32,38),,0:PAINT(50,
38),,0:PAINT(10,70),,0:DRAW"C0D1
4L2U12G3D9LU8"
63 PRESET(6,54):PRESET(18,44):PR
ESET(32,38):PRESET(50,38):POKE17
8,1:PAINT(100,90),,0:PAINT(2,70)
,,0:PAINT(210,28),0,0:PAINT(194,
22),0,0:PAINT(80,22),0,0:POKE178
,133:PAINT(2,2),,0:PAINT(252,2),
,0:POKE178,105:PAINT(40,2),,0
64 RETURN
65 LINE(0,0)-(255,96),PSET,BF:CO
LOR5,5:FORK=1TO255STEP2:LINE(K,R
ND(10)+30)-(K+RND(4)-1,RND(10)+6
0),PSET:LINE(K,RND(10)+50)-(K+RN
D(4)-2,RND(10)+80),PSET:NEXT:FOR
K=1TO15:CIRCLE(205,15),K,5:NEXT:
FORK=1TO100:PRESET(RND(255),RND(
30),5):NEXT
66 DRAW"BM190,15C0R10F2DG2L4G2L4
":PAINT(196,17),0,0:DRAW"BM220,1
0L10GDFR4FR6":PAINT(214,12),0,0
67 RETURN
68 DRAW"BM0,30R130NM-16,+65R20NM
+155,+46NR155":PAINT(140,90),0,0
:DRAW"L10C5F6LH6BF12F8LH8BF16F10
LH10BF20F12LH12C0":FORX=0TO254ST
EP4:U$="NU"+STR$(RND(5)+10):DRAW
"BM=X;,30XU$;RXU$;RXU$;RXU$;":NE
XT
69 POKE178,1:PAINT(2,2),,0:POKE1
78,2:PAINT(2,90),,0:PAINT(250,40
),,0:FORX=1TO200:PRESET(RND(255)
,RND(65)+30):NEXT:FORX=1TO80:PSE
T(RND(255),RND(15),5):NEXT
70 RETURN
71 COLOR5,0:PCLS:FORK=0TO5:CIRCL
E(K+64,62),16,5,1.1,.1,.85:CIRCL
E(K+64,58),8:CIRCLE(K+82,60),8,5
,1.1,.1,.85:CIRCLE(K+98,58),8:CI
RCLE(K+144,58),8:NEXT
72 DRAW"BM122,48M+3,-5FR15M-16,+
29R8E3M+2,+7M-3,-2L17M+16,-29L6M
-4,+1BM156,48R4M+8,+12U11M-2,-1R
6GD30M-9,-24D21M+1,+2L6E2U24H4BM
174,48R10E2D6H2L5D8M+5,-2D6M-5,-
1D12R5E2D6H2L10M+1,-2U22M-1,-2":
PAINT(137,49),5,5:PAINT(170,62),
5,5:PAINT(176,62),5,5
73 FORK=1TO200:PSET(RND(255),RND
(96)):NEXT
74 RETURN
```

9	139	105	114
19	238	115	174
26	66	127	102
32	46	136	244
38	127	143	41
46	185	149	220
52	90	158	204
60	90	166	249
69	159	175	48
76	64	183	0
83	213	193	247
91	124	203	122
99	88	END	200

Listing 3: COCOZONE

```
0 'COCO ZONE 1.0, (C) 1985 BRUCE
 K. BELL
1 EXEC32211
2 CLEAR500,32210:DIM D(140),R(14
0),R$(24),O$(37),O(37),P(18)
3 GOTO199
4 PRINT@256,STRING$(128,32):PRIN
T@256,"LOCATION: ";:IFR$(R(R))="
TUNNEL"ANDO(11)<200THENPRINT"TOT
AL DARKNESS":PMODE2,1:PCLS0:PMOD
E4,1:GOTO7ELSEIFR=60ANDP(4)=1THE
NPRINT"IN THE CASKET":IFP(0)<2TH
ENIFP(5)=1THENPMODE2,1:PCLS0:PMO
DE4,1:GOTO7
5 X=0:PRINTR$(R(R)):PRINT@320,"Y
OU SEE:":FORK=0TO37:IFO(K)=R THE
NX=X+1:PRINT@319+X*11,O$(K)
6 NEXT:T=0:PRINT@308,"VIEW: "MID
$("NSEW",U,1):PRINT@288,"EXITS:
";:FORK=1TO4:IF(D(R)ANDV(K))=V(K
)THENPRINT@292+3*K,MID$("NSEW",K
,1):NEXTELSENEXT
7 P(2)=P(2)+1:PRINT@384,"WHAT NE
XT";:INPUTA$:IFA$=""THEN7ELSEPRI
NT@384,STRING$(126,32);:PRINT@41
6,"";:
8 D=INSTR(1,"NSEW",A$):IFD=0THEN
23ELSEU=D:IF(D(R)ANDV(D))<>V(D)T
HEN22ELSEIFU=1THENR=R-10ELSEIFU=
2THENR=R+10ELSEIFU=3THENR=R+1ELS
ER=R-1
9 ONU GOTO10,11,12,13
10 C=-10:W(0)=8:W(1)=2:W(2)=1:GO
TO14
11 C=10:W(0)=4:W(1)=1:W(2)=2:GOT
```

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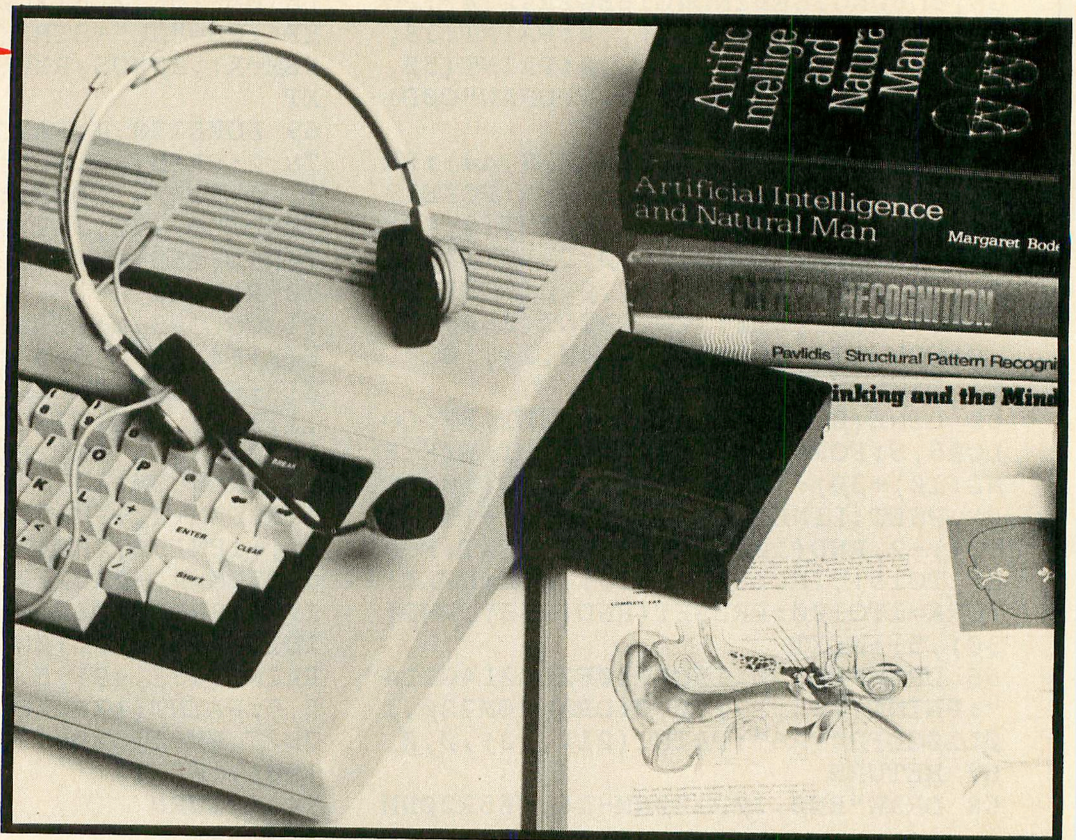
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CENT
CLEAR
CLOSE
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DIAL
DOLLAR
DOWN
DOOR
EAST
END
ENTER
FAST
FASTER
FIFTH
FIRST
GET
GO
HALF
HAVE
HOUR
IN
IS
IT
LEAVE
LEFT
LEVEL
LOVE
MORE
MULTIPLY
NEAR
NEED
NEXT
NICKEL
NO
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NUMBER
OF
OFF
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OUT
PASS
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GOING
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HERE
HOLD
INCORRECT
INCREASE
JUST
KEY
LESS
LESSER
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LOWER
LOWEST
MONEY
MOVE
NEAR
NEED
NEXT
NOT
NOTICE
ONWARD
OPEN
OR
OVER
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THIRTEEN
FOURTEEN
FIFTEEN
SIXTEEN
SEVENTEEN
EIGHTEEN
NINETEEN
TWENTY
THIRTY
FORTY
FIFTY
SIXTY
SEVENTY
EIGHTY
NINETY
HUNDRED
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
U
V
W
X
Y
Z
THOUSAND
ZERO
ALPHA
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MEASURE
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only . . . $59.95

SUPER VOICE is no ordinary speech synthesizer. It uses Silicon Systems, Inc. SSI-263, the most advanced speech/sound chip available. SUPER VOICE is not only capable of highly intelligible speech, sound effects, and singing over a 6 octave range, but now we have turned SUPER VOICE into a monophonic Super Music Synthesizer with our PIANO KEYBOARD.

IT TALKS. A free TRANSLATOR text-to-speech program makes writing your own talking program as easy as SAYING "HELLO."

SUPER VOICE works in any 32K or 64K computer. A disk system requires a Y-Cable or Multi-Pak.

FREE "REACTION" To Test Your Reflexes

FREE SUPER VOICE SINGS THE STAR SPANGLED BANNER

FREE "SIMON" To Test Your Memory

Here are the facts; the decision is yours.

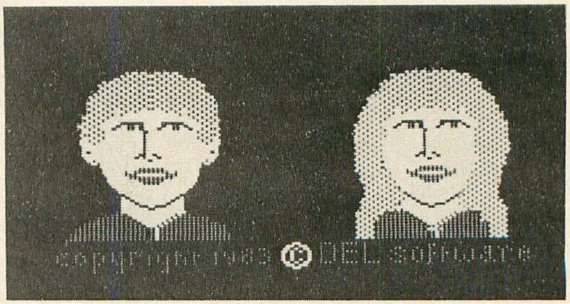
	SUPER VOICE	REAL TALKER	RS SPEECH CARTRIDGE	VOICE-PAK
Synthesizer Device	SSI-263	SC-01	SP-256	SC-01
Speaking Speeds	16	1	1	1
Volume Levels	16	1	1	1
Articulation Rates	8	1	1	1
Vocal Tract Filter Settings	255	1	1	1
Basic unit of Speech	64 phonemes 4 durations each	64 phonemes	64 allophones 5 pause lengths	64 phonemes
Pitch Variations	4096 (32 absolute levels with 8 inflection speeds)	4	1	4

SAVE $24.95

FREE

SUPER TALKING HEADS

Paul and Pauline, our talking heads program is normally $24.95. Until May 15 we will include them with each SUPER VOICE order.



FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

Speech Systems

38W 255 DEERPATH ROAD
BATAVIA, ILLINOIS 60510
(312) 879-6880 (TO ORDER)
1 MEGABYTE COLORAMA (312) 879-6811 (24 HR. BBS)

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL OR BBS.

'TALKING SOFTWARE'

FOR THE VOICE, SUPER VOICE™, RS SPEECH & SOUND PAK

RADIO SHACK® SPEECH & SOUND TRANSLATOR

FREE
When you buy
any 5 of our
Talking Programs

We believe that no COCO speech synthesizer gives you the power and flexibility of the SUPER VOICE. Nevertheless, some have decided to go with the Radio Shack SPEECH & SOUND PAK. For those we've decided to open our TALKING LIBRARY by offering the SPEECH & SOUND TRANSLATOR . Just load this program and our entire library is open to you.

But that's not all, this program adds features. You get increased intelligibility, the power of an exception table to specify specific pronunciations, $12.81 is spoken in dollars and cents, 1,234,567 is spoken in millions, thousands, and hundreds, and much more. **$24.95**

TERMTALK All the features of an intelligent telecommunications program plus what appears on the TV is spoken.

- Upload and Download programs
- Full or Split Screen
- Normal or Reverse Video
- Control Xmit Protocols
- Buffer Editing
- It talks

Please specify version (VOICE or RS SPEECH & SOUND PAK)
Tape **$39.95** Disk **$49.95**

TALKING BINGO BINGO was never like this. The VOICE or SUPER VOICE makes all the calls while you sit back and play. Comes with 20 playing cards and 200 markers. High Resolution graphic screen, 3 timing level, ball count and pause control. **$24.95**

ESTHER the talking psychoanalyst. An excellent example of artificial intelligence. She may not solve all your problems, but her insight will amaze you. Just like the original Eliza. **$24.95**

SCORE E-Z A yahtzee type game. Up to six can play. **$24.95**

ADVENTURES

CULT OF THE CAVE BEAR You're a stranded time traveler 50,000 years in the past. Can you fix your time machine while still surviving in this alien environ, and make it back? **$29.95**

SHIP HUNT Play Battleship with your CoCo. All status reports are spoken. Ready battery, aim, fire at will! **$24.95**

FINAL COUNTDOWN You must stop the mad general from launching a missile at Moscow and causing WW III. Has multiple voices for added realism. **$24.95**

STAR TALK You're the Star Fleet Captain. Your mission...destroy the enemies' Dragon Star Ships. All status reports are spoken! **$24.95**

FOOL'S CROSSING The world's first TALKING HI-RES GRAPHICS adventure. Finding the hidden treasure is the easy part, getting back home is another story. **$24.95**

ADVENTURE GENERATOR Create talking adventure games that are 100% Machine Language. Up to 99 rooms, 255 objects, 70 command words and 255 conditional flags. 64K Disk **$39.95**

SUPER VOICE SONGBOOKS

These two songbooks were specifically designed for the SUPER VOICE, the only speech synthesizer flexible enough to allow singing.

VOLUME I (POTPOURRI) A collection of miscellaneous tunes for everyone. Songs include: How Much Is That Doggie in the Window, Daisy, Aloha Oe, Old McDonald and more. **$19.95**

VOLUME 2 (NURSERY RHYMES) Includes: Twinkle Twinkle Little Star, Mary Had A Little Lamb, 3 Blind Mice, the Alphabet Song and more. May be used with SUPER TALKING HEADS so they (Paul & Pauline) sing the songs. **$19.95**

EDUCATION

ANIMATED SENTENCES The child builds complete sentences from a graphic menu using keyboard or joystick. The action is then spoken and acted out graphically. It's a great way to learn the parts of speech (i.e. verb, subject, noun, etc.). **$24.95**

KING AUTHOR'S TALES A creative writing tool to allow a child to write compositions, or short stories. Q & A option is also included. **$29.95**

COLOR MATH Addition, Subtraction, Multiplication, and Division are mastered. Student may specify difficulty level. **$24.95**

SPELL-A-TRON Student builds a dictionary of words to be quizzed on. Perfect for Spelling B. **$24.95**

SPELLING TESTER A graphic spelling game. The student is shown objects to be spelled. **$9.95**

POETRY CREATOR The VOICE speech unit is used to speak poetry that is created. **$9.95**

SHORT STORY MAKER A program to create and speak stories created by the child. **$9.95**

FOREIGN LANGUAGE Learn a foreign language. French dictionary is included. **$9.95**

PRESIDENTS The student is able to master the Presidents of the U.S. **$9.95**

STATES A program designed to aid the student in learning correct spelling of the states. **$9.95**

CAPITALS Learning the State's Capitals is made more interesting using speech. **$9.95**

HANGMAN A word guessing game. You must guess the word before you hang. **$9.95**

MATH DRILL A program to help teach arithmetic. **$9.95**

All software, except as noted, shipped on tape but may be moved to disk.

SYMPHONY 12™

A 12 VOICE POLYPHONIC STEREO MUSIC SYNTHESIZER

NEW! 61 NOTE KEYBOARD

$20 OFF

musical applications of microprocessors

- 12 SIMULTANEOUS VOICES
- STEREO & MONO
- 4 NOISE GENERATORS
- SOUND EFFECTS
- PLAYS AND MAKES MUSICA 2 FILES

SUPER POLYPHONIC. Speech Systems is proud to bring you SYMPHONY 12, a polyphonic 12 voice hardware stereo music synthesizer for the Color Computer. SYMPHONY 12 also gives you 4 noise generators for percussion synthesis and sound effects. The PIANO KEYBOARD and MUSICA 2 (sold separately) turns your COCO into a real music machine with incredible flexibility.

STEREO and MONO. By connecting SYMPHONY 12 to your home stereo system, music is produced in stereo, 6 voices from each channel. However, you don't need to have a stereo system, all 12 voices also come out of your TV or monitor.

PICK AN INSTRUMENT. SYMPHONY 12 lets you choose from 10 preset instruments to synthesize chimes, violin, oboe, banjo, harpsichord, piano and more. You can even change instruments as the music plays.

SOUND EFFECTS. SYMPHONY 12 is a sophisticated sound generator. 12 voices and 4 noise generators give you incredible sound effect capability. We have included gun shot, explosion, racing car and more.

WATCH IT PLAY. As SYMPHONY 12 plays, a graphics display of a piano keyboard shows the notes playing. The display is entertaining as well as very educational.

PLAY MUSICA 2 FILES. Thousands of MUSICA 2 users will be excited to know SYMPHONY 12 plays all music developed using MUSICA 2 like you have never Seen or Heard it. In fact we highly recommend the use of MUSICA 2 as a composition development tool for SYMPHONY 12. Use MUSICA 2's superior graphics input capability and then play it through SYMPHONY 12. You can also take advantage of our MUSIC LIBRARY series (sold separately) to give you access to over 500 music pieces representing 20 hours of music.

ULTIMATE MUSIC DEVELOPMENT SYSTEM. SYMPHONY 12, MUSICA 2, and the PIANO KEYBOARD give you incredible flexibility. Imagine sitting down at the PIANO KEYBOARD, playing a piece and recording it as you play just as you would to a tape recorder. Save your masterpiece and then using MUSICA 2 edit it if you like and print it. If you have a MIDI synthesizer, you can take the music and play it using COCO MIDI (sold separately). Try that on an IBM, APPLE, or COMMODORE (good luck).

PIANO KEYBOARD. For those wishing to turn SYMPHONY 12 into a real polyphonic synthesizer we offer the extremely powerful and versatile PIANO KEYBOARD. The PIANO KEYBOARD was deisgned to be used in our entire music product line. You can use it with SYMPHONEY 12, MUSICA 2, SYNTHER 77 PLUS, and even our advanced speech synthesizer, SUPER VOICE.

When using MUSICA 2, you will be using 4 of the 12 voices available from SYMPHONY 12. To take advantage of the full 12 voice capability of SYMPHONY 12 you may use either the Color Computer's keyboard or the PIANO KEYBOARD.

Y-CABLE or MULTI-PAK. Tape users using both SYMPHONY 12 and the PIANO KEYBOARD will require a Y-CABLE. Disk users will require the Triple Y-Cable or MULTI-PAK.

SYMPHONY 12. You get over a dozen music and sound effect selections and complete documentation. Software is shipped on Tape or Disk.

SYMPHONY 12	$79.95
SYMPHONY 12 (with Keyboard order)	$59.95
OPTIONS	
MUSIC LIBRARY (each volume)	$29.95
MUSICA 2	$29.95
PIANO KEYBOARD (61 note)	$119.95

FREE BLANK DISK OR TAPE WITH EVERY ORDER

VISA® MasterCard

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
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(312) 879-6880 (TO ORDER)
(312) 879-6811 (24 HRS. BBS)

1 MEGABYTE COLORAMA

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL OR BBS.

COCO MIDI SEQUENCER/EDITOR

Now your COCO can talk to your MIDI music synthesizer. Whether you have a Korg, Roland, Casio, Yamaha, or Moog, it doesn't matter as long as it's MIDI equipped. Choose from our entry level MUSICA 2 COCO MIDI system that plays MUSICA files or our Professional COCO MIDI SYSTEM.

- Supports 8 digital tracks.
- 1,500 events per track.
- 12,000 events all 8 tracks.
- May be used as an advanced sequencer.
- User friendly high res. graphics display.
- Menu driven.
- Help command explains features.
- Real time recording.
- Save your masterpiece to tape or disk.
- Tempo may be modified.

- Playback any or all 8 tracks at any tempo.
- Tracks may be deleted, copied, transposed or mixed.
- Filter out unwanted channel or type of MIDI data.
- Simple music text editing.
- Requires 64K.
- Transposition.

Comes complete with Rom Pak Hardware interface, cables, manual, and software. Disk users require Y-Cable or Multi-Pak $149.95

Now under development, voicing patch libraries for the Casio CZ series of synthesizers.

CZ-101 USERS!

We offer the CZ-101 CONNECTION and the 61 NOTE PIANO KEYBOARD to turn the 101 into a professional full size synthesizer.

CZ-101 CONNNECTION . $29.95
61 NOTE KEYBOARD . $119.95

MUSICA MIDI™

COCO MIDI takes any MUSICA 2 music file and plays it through your music synthesizer. We offer you over 800 tunes from our MUSIC LIBRARY series (sold separately) or create your own music using the best music composition program available, MUSICA 2 (sold separately).

COCO MIDI includes: documentation, plenty of music, and the cable to connect between the COCO and your synthesizer. . . . . **$39.95** Tape or Disk

MUSIC LIBRARY™

The MUSIC LIBRARY series consists of 8 volumes: 100 through 800 each sold separately. Each contains over 100 four voice music selections with a playing time of over 3 hours each. The disk version is shipped on 5 full disks. When coupled with the STEREO PAK, the music is reproduced with unsurpassed realism.

A JUKEBOX program is included to allow you to select specific songs or automatically play each. These songs are ready to go, you don't need MUSICA 2 or a knowledge of music. MUSICA 2 users may customize each song. Each volume sold separately, specify tape or disk. . . . . **$29.95** Tape or Disk

MUSIC LIBRARY 100

Stage, Screen, & TV
Music of the 70's
Music of the 60's
Music of the 50's
Old Time Favorites
Classical
Christmas (popular)
Christmas (traditional)
Patriotic
Polka Party

MUSIC LIBRARY 200 (another 100 selections)
MUSIC LIBRARY 300 (another 100 selections)
MUSIC LIBRARY 400 (another 100 selections)
MUSIC LIBRARY 500 (another 100 selections)
MUSIC LIBRARY 600 (another 100 selections)
MUSIC LIBRARY 700 (another 100 selections)
MUSIC LIBRARY 800 (another 100 selections)

Entire Library
30 Hours of
Music!
40 disks
or
25 tapes

SYNTHER 77 PLUS

You control vibrato pattern, Bender rate, Volume level as well as Attack, Decay, Sustain, and Release (ADSR envelope). As you play you can record, then edit and save it to disk or tape. You can even fine tune it to match other instruments.

The PIANO KEYBOARD is not necessary, you can use your COCO keyboard but the PIANO KEYBOARD makes your COCO a real music instrument. . . . . . **$29.95** Disk only

STEREO PAK™

Plug this gem into your computer, connect to your home stereo system and sit back and enjoy music realism. The STEREO PAK is a hardware music synthesizer that plays our MUSIC LIBRARY series and MUSICA 2 music in stereo. Because it was designed specifically with music reproduction in mind, the sound is superb. The highs are crisp and clear while the bass notes will rattle your walls. Internally we use two high performance 8 bit digital to analog converters to assure fidelity.

The STEREO PAK is all hardware. It is intended as an enhancement for MUSICA 2 and our MUSIC LIBRARY series. Disk users will require our Y-CABLE or a MULTI-PAK. **$29.95**

NEW
LOW
PRICE!

NEW! 61 NOTE PIANO KEYBOARD

ATTENTION CZ-101 OWNERS

Our new 61 note (5 octave) full size keyboard is perfect for the beginner or professional. To give the PIANO KEYBOARD the most flexibility, we give you a choice of 5 different products to use: **SYMPHONY 12, MUSICA 2, SYNTHER 77 PLUS, SUPER VOICE,** and **the CZ-101 CONNECTION.**

The PIANO KEYBOARD and **SYMPHONY 12** turns the COCO into a 12 voice music synthesizer. When used with **MUSICA 2,** the PIANO KEYBOARD provides a user-friendly means of inputting music. For those wishing control over Vibrato, Volume, Bender, as well as Attach, Decay, Sustain, and Release (ADSR), we offer **SYNTHER 77 PLUS,** a monophonic synthesizer. **SUPER VOICE,** COCO's most advanced speech synthesizer, doubles as a music synthesizer when used with the PIANO KEYBOARD. For those with the Casio CZ-101 music synthesizer, the **CZ-101 CONNECTION** allows you to connect the "full size" PIANO KEYBOARD to give you standard keyboard.

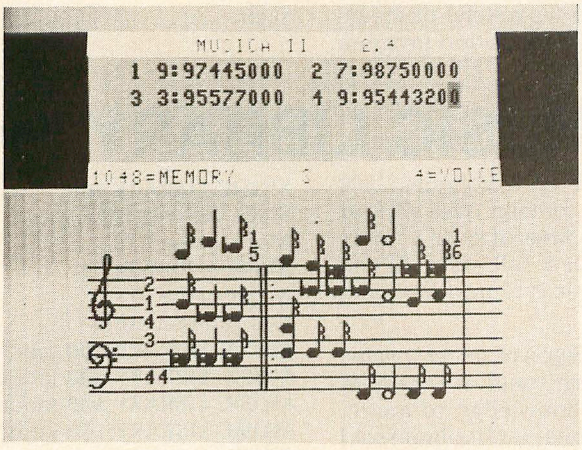
61 NOTE PIANO KEYBOARD	**$119.95**
CZ-101 CONNECTION	**$ 29.95**

MUSICA 2

$29.95

Tape or Disk

- When in stereo mode, music is played through our STEREO PAK (purchased separately).
- Loudness of each voice may be individually specified.
- Memory available is constantly displayed.
- Voice waveshapes may be exchanged between voices at any point.
- Tempo may be specified and may even be altered as the music plays.
- Flats and sharps supported.
- Billions of timbre combinations.
- High resolution graphic display, looks just like sheet music.
- MUSICA 2 is 100% software, no need for hardware unless you want music produced in STEREO. In that case, the STEREO PAK may be purchased separately. It's a must for the audiophile!
- Repeat bars allow repeating of music without re-inserting music a second or third time.
- 30 page manual describes all.
- Requires 64K.

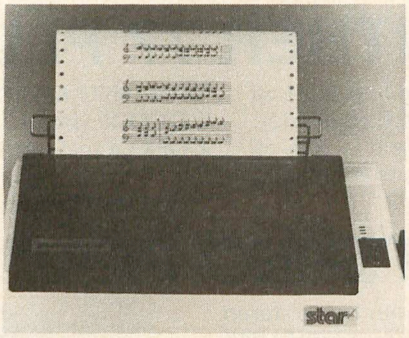


```
        MUSICA II      2.4
   1 9:97445000  2 7:98750000
   3 3:95577000  4 9:95443200

1048=MEMORY      3          4=VOICE
```

- Output music to your printer (Gemini 10X, Epson, R.S. printers).

- Allows you to specify key signature.
- Voice timbre (waveshape) may be altered by specifying harmonic content just like stops on an organ.
- During editing, voice being inserted is displayed.
- Each measure is numbered for easy reading of music.
- Measure bars aid in reading and developing music.
- Each voice may be visually highlighted for easy identification.
- 4 Voices produced simultaneously.
- Input notes from Coco keyboard, joystick, or Piano Keyboard.



- Play music from your own BASIC program.
- Block copy music for easy music development.
- 100% machine language so it is lightning fast.
- Vibrato effect easily produced.
- With STEREO PAK, voices may be switched between left and right speakers as music plays.
- Durations include: whole, half, quarter, eighth, sixteenth, thirty-second, sixty-fourth, and triplet.

MUSIC THEORY

COURSE 1

This course covers all the basics from music notation & duration, key signatures, tempo, to an introduction of the keyboard. This is an entry level course recommended as a prerequisite for Course 2. 32K Disk only **$49.95**

COURSE 2

A more advanced course that deals with: Major and Harmonic Minor scales, interval spelling, Triad (Chord) theory, Inversions, Dominant 7th chords, and ear training of the intervals. 32K Disk only . **$49.95**

'HOME COMMANDER'

$59.95

VOICE CONTROL APPLIANCES WITH EARS

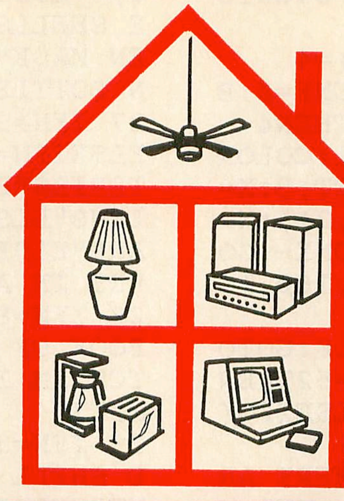
The HOME COMMANDER easily connects to the cassette port of your Color Computer and lets you control appliances in your home.

NO WIRES NECESSARY

The HOME COMMANDER uses your home's existing electrical wiring to control virtually anything. Appliances are controlled via small control modules available at your local SEARS or Radio Shack store.

ON FRIDAY 7:42 PM, OFF SUNDAY 1:26 AM

Included FREE is a program to allow you to control up to 256 devices and specify the time and date they are to be activated. That's right, the software has its own built in accurate clock.



Imagine controlling a light or TV with your voice. When used with our Electronic Audio Recognition System, EARS, you can literally control any appliance.

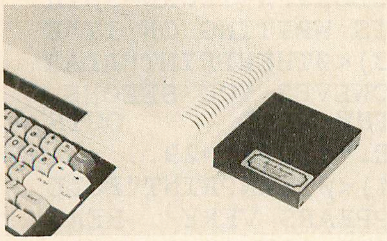
PLUG'N POWER USERS

If you were disappointed in the software that came with the Radio Shack PLUG'N POWER unit, and you probably were, we'll offer you our powerful software separately. An early version is described in the Feb., April, June, and August 1983 issues of RAINBOW. Our current version is even better. **$19.95**

PLUG'N POWER is a trademark of Radio Shack®

PRECISION TIME MODULE $59.95

— INCLUDES OS9 DRIVER —



Now your computer will always know the correct time and date. This amazing precision time module is calibrated to the National Bureau of Standards (WWV) atomic clock and you should never have to change it.

Use the PRECISION TIME MODULE to add the time element to your games or use on BBS. If you like, purchase separately our BBS.

COLORAMA BBS (64 K, 1 drive minimum) **$99.95**

BATTERY BACKUP

Even when your computer is off, the clock keeps correct time by operating using the internal battery backup system.

THE TIMEPIECE FOR THE COLORAMA BBS

FREE TALKING CLOCK PROGRAM requires VOICE, SUPER VOICE, or SPEECH & SOUND PAK

MONTHS, LEAP YEARS & DST

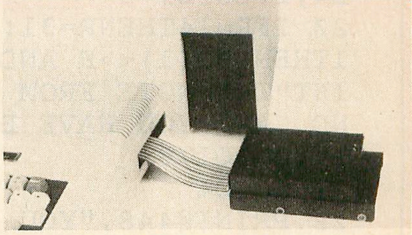
The PRECISON TIME MODULE automatically adjusts for the different number of days in each month as well as leap years. And believe it or not, it adjusts for DST so you don't have to remember if it's SPRING FORWARD or FALL FORWARD.

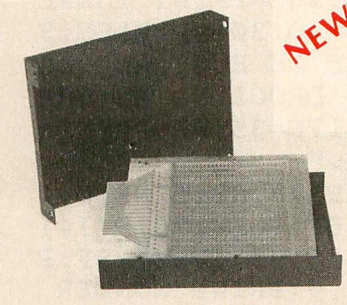
Y-CABLE $28.95

Why pay $100 to $200 for a multi-pak. With the Y-CABLE, you can connect your disk system to your computer along with either our STEREO PAK music synthesizer, our VOICE, SUPER VOICE speech synthesizers, or our PRECISION TIME MODULE. All connectors gold plated.

TRIPLE Y $34.95

We developed the Triple Y-Cable specifically for those interested in both speech synthesis and speech recognition. The Triple Y-Cable lets you connect EARS and SUPER VOICE to your color computer along with your disk system.





NEW! ATTENTION EXPERIMENTERS!

Interested in building your own project? Our oversized board gives plenty of room for construction while the sturdy aluminum case with black satin finish assures protection and a professional appearance.

Prototype Board only **$19.95**
Prototype Enclosure only **$19.95**
Buy both for **$29.95**

Advanced Speech Chip
SSI-263
(SC-02)
$34.95

Need an SC-01? **$29.00**

Disks .... (any quantity)	$1.49
Tape C-10, C-20	$0.69
Hard Tape Box	$0.29
6821	$2.95
74LS138	$0.79
7407	$0.79
IC sockets 14, 16, 22 pin	$0.29
IC sockets 24, 28, 40	$0.39

FREE BLANK DISK OR TAPE WITH EVERY ORDER

Dealer Inquiries Invited

We accept CASH, CHECK, COD, VISA and MASTER CARD orders.

Shipping and handling US and Canada	$3.00
Shipping and handling outside the US and Canada	$5.00
COD charge	$2.00

Illinois residents add 6¼% sales tax

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(312) 879-6880 (TO ORDER)
1 MEGABYTE COLORAMA **(312) 879-6811 (24 HR. BBS)**

CALL ANY DAY TO ORDER. ALSO ORDER BY MAIL OR BBS.

```
014
12 C=1:W(0)=2:W(1)=4:W(2)=8:GOTO
14
13 C=-1:W(0)=1:W(1)=8:W(2)=4
14 IFR$(R(R))<>"TUNNEL"THENF=0:B
=5ELSEF=5:B=0:IFO(11)<200THEN4
15 PMODE2,1:PCLSB:PMODE4,1:COLOR
F,B:LINE(0,0)-(255,96),PSET,B:X=
INSTR(1,S$,LEFT$(R$(R(R)),3)):X=
(X+2)/3:IFX<10GOTO138ELSEONX-9GO
TO140,144,146,151,154,157,160,16
2,163,165,169
16 IFR=50ANDP(12)=1THENN=18:GOTO
54ELSEIFR=65THEN41ELSEIFR=52THEN
IFP(13)=1THENN=22:GOTO59ELSEIFO(
22)=52THENN=21:GOTO124
17 IFR=70THENPRINT@416,"THERE AR
E SOME NUMBERS SCRIBBLEDON THE N
ORTH WALL":IFU=1THENPRINT@106,P(
15)"="P(16)"="P(17)
18 IFR=69ANDP(18)=0THENPRINT"THE
RE IS A PADLOCKED DOOR TO THEEAS
T":IFU=3THENDRAW"BM110,90C0U70R5
0ND70BG12L26D20R26U20":POKE178,6
4:PAINT(126,36),,0:POKE178,0
19 IFR=10THENPRINT"YOU ENTERED A
 TRAP FOR POTENTIALESCAPEES. YOU
 ARE IN ISOLATION  FROM WHICH TH
ERE IS NO ESCAPE.";:FORK=1TO20:P
MODE2,1:POKE179,K:PCLS:PLAY"L255
;O4;1;2;3;4;5;6;7;8;9":NEXT:PMOD
E4,1:GOTO178
20 IFR=14THENR=31:GOTO14ELSEIFR>
1THENIFO(1)<>R ANDO(1)<145THENPR
INT"THE NOTE FROM GEORGE WAS FOU
ND  AND YOU HAVE BOTH BEEN CAUGH
T":GOTO178
21 GOTO4
22 PRINT@448,"YOU CANNOT GO THAT
 WAY":GOTO4
23 AV$=LEFT$(A$+"    ",3):AN$=MID
$(A$+"    ",INSTR(1,A$," ")+1,4)
:V=INT((2+INSTR(1,V$,AV$))/3):N=
INT((3+INSTR(1,N$,AN$))/4)
24 ONV GOTO25,25,39,39,46,49,49,
51,61,62,68,75,76,82,84,86,88,90
,92,99,103,104,108,113,118,121,1
21,124,126,128,130,133:PRINT"SOR
RY. I DO NOT UNDERSTAND.":GOTO4
25 IFP(5)=1ANDR=60THEN14:GOTO4EL
SED=INSTR(1,"NORTSOUTEASTWEST",A
N$):IFD>0THENU=(D+3)/4:ONU GOTO1
0,11,12,13ELSEIFAN$="LOOK"THEN14
:GOTO4ELSEIFN>15THEN31ELSEIFO(N)
<150THENPRINT"YOU DO NOT HAVE IT
.":GOTO4
26 IFN=1ORN=12THENPRINT"THERE IS
 WRITING ON IT"ELSEIFN=2THENPRIN
T"IT IS TORN. IT IS A LIST OF SO
MESORT.":MID$(N$,5,4)="LIST":O$(
2)="LIST"ELSEIFN=4THENPRINT"RIFL
E SHELLS"ELSEIFN=5THENPRINT"OXYG
EN MASK"ELSEIFN=6THENPRINT"OXYGE
N BOTTLE MARKED FULL"
27 IFN=9THENPRINT"HAND OPERATED"
ELSEIFN=11THENPRINT"CONTAINS BAT
TERIES"ELSEIFN=13THENPRINT"SOFT
LENS"ELSEIFN=14THENPRINT"VERY SH
ARP"ELSEIFN=15THENPRINT"VERY STU
RDY IN APPEARANCE"
28 IFN=8THENIFP(0)=0THENPRINT"A
BOOK OF MATCHES WITH ONLY ONE MA
TCH IN IT"ELSEPRINT"COMPLETELY E
MPTY"
29 IFN=3THENIFP(1)=0THENPRINT"TH
E SHELL CHAMBER IS EMPTY"ELSEPRI
NT"THERE IS A SHELL IN THE CHAMB
ER"
30 GOTO37
31 IFO(N)<>R THENPRINT"THAT IS N
OT HERE":GOTO4ELSEIFN=16ORN=30TH
ENPRINT"THERE IS WRITING ON IT"E
LSEIFN=17ANDO(3)<0THENPRINT"ALAR
M PROTECTED. HOWEVER YOU SEEONE
RIFLE AGAINST THE WALL      OUTS
IDE THE GUNCASE.";:O(3)=29
32 IFN=19ANDO(4)<0THENPRINT"FULL
 OF AMMO AND APPEARS VERY   HEAV
Y":O(4)=R ELSEIFN=21THENPRINT"A
REMBRANDT ORIGINAL I BELIEVE"ELS
EIFN=25ANDO(9)<0ANDO(10)<0THENPR
INT"THE DRILL AND SHOVEL LOOK","
INTERESTING":O(9)=R:O(10)=R
33 IFN=24THENIFP(4)=0THENPRINT"I
T IS EMPTY"ELSEIFP(5)=0THENPRINT
"IT IS OPEN"ELSEPRINT"TOTAL DARK
NESS."
34 IFN=26THENPRINT"SLOW EASY RAP
IDS"ELSEIFN=27THENPRINT"LOOKS IN
VITING"ELSEIFN=29THENPRINT"THERE
 IS A SIGN ON IT":O(30)=R ELSEIF
N=31THENPRINT"SHE IS HUGE AND UG
LY. ALSO SHE  IS DROOLING AS SHE
 APPROACHES"ELSEIFN=35THENPRINT"
TYPE <A> I THINK."
35 IFN=23THENPOKE178,88:LINE(0,0
)-(255,95),PSET,BF:POKE178,P(14)
:LINE(100,50)-(156,95),PSET,BF:P
OKE178,0:POKE179,0:PRINT"WONDER
WHAT IS BEHIND IT?"
36 IFN=33THENPRINT"A STURDY BRAN
CH ARCHES ACROSS   THE PIT OPENI
NG ABOVE"ELSEIFN=34THENR=R+10:GO
TO14ELSEIFN=37THEN180
37 IFPEEK(1440)=96THENPRINT"YOU
SEE NOTHING SPECIAL"
38 GOTO4
39 IFO(N)=150THENPRINT"YOU ALREA
```

```
DY HAVE THAT":GOTO4ELSEIFO(N)>=0
ANDO(N)<>R THENPRINT"THAT IS NOT
 HERE":GOTO4ELSEIFN=37THEN44ELSE
IFN>15ORO(N)<0THENPRINT"YOU CANN
OT GET THAT":GOTO4ELSEIFP(3)>6TH
ENPRINT"YOUR HANDS ARE FULL":GOT
O4
40 P(3)=P(3)+1:O(N)=150:PRINT"TA
KEN":IFN=6ANDR=50THENLINE(158,52
)-(166,43),PSET,BF ELSEIFN=5ANDR
=50THENLINE(158,40)-(170,34),PSE
T,BF
41 IFR=65THENIFO(9)=150THENDRAW"
BM110,41C5EL2ED2U7ER3EU7HL3HU5EH
EHEHEHEHEHEHEHC0"
42 IFR=65THENIFO(10)=150THENPOKE
178,99:LINE(222,24)-(236,70),PSE
T,BF:POKE178,0
43 IFR=100THENIFN=11THENPRINT"YO
U TRIPPED AND SPRAINED YOUR   AN
KLE"
44 IFN=12THENGOTO14ELSEIFN=37THE
NPRINT"YOUR GREED HAS DEFEATED Y
OU. YOUARE NOW TRAPPED IN THE PO
OL AS  GEORGE ESCAPES":GOTO178
45 GOTO4
46 IFN<>8ORO(N)<150THENPRINT"YOU
 CANNOT DO THAT":GOTO4ELSEIFR<>6
0THENPRINT"YOU HAVE WASTED YOUR
ONLY MATCH AND PROBABLY THE GAME
":P(0)=1:GOTO4
47 IFP(0)>0THENPRINT"YOUR MATCH
IS ALREADY SPENT":GOTO4ELSEP(0)=
2:PMODE2,1:PCLS5:PMODE4,1:PRINT"
A MESSAGE APPEARS ATTACHED TO
THE CASKET LID OVER HEAD. IT
SAYS..."
48 PRINT@0,"YOU FOOL. IT WAS I W
HO STOLE THEAFRICAN JEWEL. AND I
T WAS I WHO FRAMED YOU. ONLY YOU
 WILL NEVER TELL BECAUSE ONLY I
KNOW YOU AREHERE AND I WILL NEVE
R TELL.",,"GEORGE RUBIX":GOTO4
49 IFO(N)<>150THENPRINT"YOU DO N
OT HAVE THAT"ELSEPRINT"OK. YOU N
O LONGER HAVE IT.":O(N)=R:P(3)=P
(3)-1
50 GOTO4
51 IFN=36ANDR=36THENPRINT"USE TH
E FOUR ARROW KEYS TO","POSITION
THE CURSOR AND PRESS   ENTER TO
OPEN DESIRED CUPBOARD.";:K=0:Z=2
:GOSUB134ELSE54
52 PRINT@416,STRING$(95,32);:PRI
NT@416,"";:POKE178,0:LINE(X,Y)-(
X+16,Y+22),PSET,BF:IFX=P(10)ANDY
```

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```
=40THENX=X+5:DRAW"BM=X;,60C5U6NR
6E2R6NG2D6G2NL6BM24,10":PAINT(X+
2,58),5,5:O(19)=R:PRINT"THERE IS
 A SMALL BOX HERE"ELSEPRINT"NOTH
ING IMPORTANT"
53 GOTO4
54 IFN<>18ANDR<>50THEN58ELSEIFP(
11)=0THENPRINT"IT IS LOCKED":GOT
O4ELSEP(12)=1:LINE(154,6)-(176,5
4),PSET,BF:FORY=18TO54STEP12:DRA
W"BM154,=Y;C5ER20GL20":NEXT:IFO(
5)=-1THENO(5)=R
55 IFO(6)=-1THENO(6)=R
56 IFO(6)=R THENDRAW"BE2BR4HU5E2
U2R2D2F2D5GL4":POKE178,1:PAINT(1
62,50),,5:POKE178,0
57 IFO(5)=R THENDRAW"BM158,40C5E
6F6L12":POKE178,2:PAINT(162,38),
,5:POKE178,0:GOTO4
58 IFN<>22ORO(22)<>52THEN60ELSEP
RINT"COMBINATION?",:INPUT"1ST NU
MBER";N1:INPUT"2ND NUMBER";N2:IN
PUT"3RD NUMBER";N3:IFN1=P(15)AND
N2=P(16)ANDN3=P(17)THENPRINT@464
,"SAFE IS OPEN"ELSEPRINT@464,"IT
 DID NOT WORK":GOTO4
59 LINE(139,8)-(165,36),PSET,BF:
DRAW"BM139,36C5E4U20NH4R18NE4D20
NF4L18C0":P(13)=1:IFO(7)=-1THENO
(7)=R
60 IFR=29ANDN=17THENPRINT"AN ALA
RM SOUNDS QUICKLY SIGNAL= ING TH
E GUARDS":GOTO178ELSE4
61 IFN<>33ORR<>135THENPRINT"WHEE
...  THAT WAS FUN.":GOTO4ELSEPRI
NT"A SUCCESSFUL JUMP...","YOU HA
VE CLEARED THE PIT.":R=133:O(33)
=134:GOTO14
62 IFR(R)<>12THENPRINT"HOW IN TH
E WORLD WILL YOU DO    THAT?":GO
TO4ELSEINPUT"WHAT TYPE OF STROKE
? <1> BUTTER=FLY  <2> FREE STYLE
  <3> DOG    PADDLE";A$:A=VAL(A$
):PRINT@416,STRING$(94,32);:PRIN
T@416,"";:ONA GOTO63,64,65:GOTO4
63 PRINT"YOU SHOULD GO OUT FOR T
HE OLYM= PICS":GOTO66
64 PRINT"A LIBERAL; NO DOUBT":GO
TO66
65 PRINT"HOW ABOUT SOME ALPO?"
66 PRINT"YOU MADE IT TO THE OTHE
R SIDE":IFD(R)=1THEND(R)=2ELSED(
R)=1
67 GOTO4
68 IFN=36ANDR=36THENFORX=24TO238
STEP24:FORY=10TO40STEP30:POKE178
,2:LINE(X,Y)-(X+16,Y+22),PSET,BF
:CIRCLE(X+4,Y+10),2,0:NEXTY,X:O(
19)=-1:IFO(4)=36THENO(4)=-1
69 IFN<>18ORR<>50THEN71ELSEP(12)
=0:POKE178,3:LINE(154,6)-(176,54
),PSET,BF:DRAW"BM159,21C0U4R4U4R
4D4R4D4L4D4L4U4L4":CIRCLE(158,30
),2:POKE178,2:PAINT(165,18),,0:P
OKE178,0:IFO(5)=50THENO(5)=-1
70 IFO(6)=50THENO(6)=-1
71 IFN=24ANDP(4)=1THENPMODE2,1:P
CLS0:PMODE4,1:PRINT"OK":O(24)=0:
P(5)=1ELSE4
72 PMODE2,3:PCLS5:PMODE4,1:PRINT
@256,"AFTER A WHILE; THE CASKET
BEGINSTO MOVE...":FORK=1TO900:NE
XT:PRINT"THEN YOU HEAR A TRUCK E
NGINE...":PRINT:A$="L255O1;1;2;3
;6;4;8;9;11;3;2;12;4;6;1;":FORK=
1TO50:PLAYA$:NEXT:FORK=1TO500:NE
XT
73 PRINT:PRINT"AFTER A FEW KNOCK
S AND BANGS ALLMOTION CEASES AND
 YOU HEAR DIRT HITTING THE CASKE
T.":FORK=12TO0STEP-1:PLAY"V=K;"+
LEFT$(A$,21)+"V12P"+STR$(RND(10)
):NEXT
74 IFO(5)<>150ORO(6)<>150THENPRI
NT@416,"SINCE YOU DO NOT HAVE TH
E OXYGENMASK OR BOTTLE; YOU HAVE
 QUICKLYSUFFOCATED FROM LACK OF
OXYGEN";:GOTO178
75 IFINSTR(1,"NSEW",LEFT$(AN$,1)
)>0THENA$=LEFT$(AN$,1):GOTO8ELSE
IFN=27ORN=24ORN=29THEN76ELSE PRI
NT"YOU CANNOT GO THERE AT THIS T
IME":GOTO4
76 IFN=33ANDR=134THENPRINT"GOOD
TRY BUT THE WALLS ARE TOO  SLIPP
ERY."ELSEIFAN$="WALL"THENPRINT"T
HIS IS DRIVING ME CRAZY TOO"
77 IFP(5)=0THENIFN=24ANDR=60THEN
IFP(4)=0THENPRINT"OK. YOU ARE IN
 THE CASKET":P(4)=1:D(60)=0:GOTO
14ELSEPRINT"OK. YOU ARE OUT OF T
HE CASKET":P(4)=0:D(60)=1:GOTO14
78 IFN=27THENIFR=111THENPRINT"TH
AT WAS REFRESHING":R=110:GOTO14E
LSEPRINT"AH... JUST WHAT THE DOC
TOR","ORDERED":R=111:GOTO14
79 IFN=15ANDR=134ANDP(8)=1THENPR
INT"IT WAS QUITE A STRUGGLE BUT
YOU PULLED YOURSELF OUT":R=135:O
(33)=135:GOTO14
80 IFN=29ANDR=140THENPRINT"THE F
ENCE WAS CHARGED AND NOW SOARE Y
OU":GOTO178
81 GOTO4
82 IFN=18ANDR=50THENIFP(11)=1THE
NPRINT"IT IS ALREADY UNLOCKED"EL
SEIFO(7)<150THENPRINT"YOU DO NOT
 HAVE THE KEY"ELSEPRINT"YOUR KEY
```

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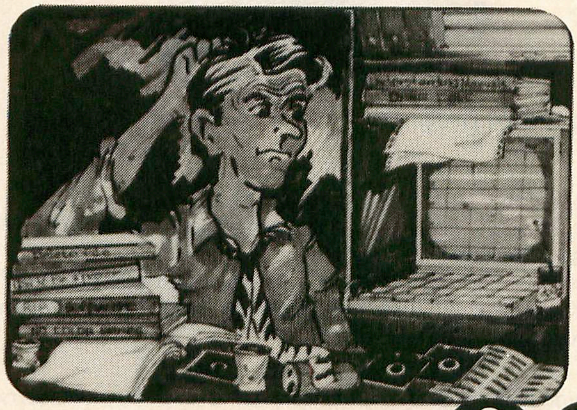

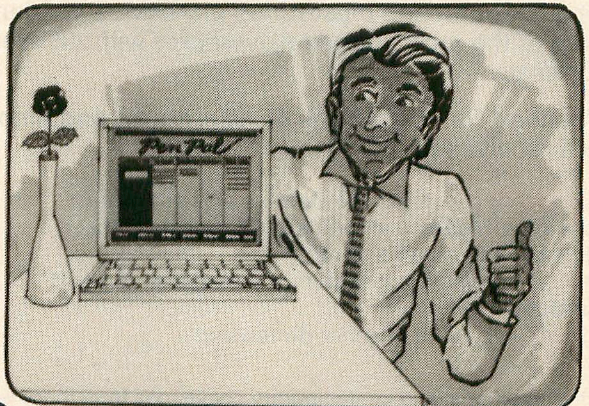

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```
 WORKED. IT IS UNLOCKED":P(11)=1
ELSEPRINT"YOU CANNOT DO THAT"
83 GOTO4
84 IFN=18ANDR=50THENIFP(11)=0THE
NPRINT"IT IS ALREADY LOCKED"ELSE
IFO(7)<150THENPRINT"YOU DO NOT H
AVE THE KEY"ELSEPRINT"OK":P(11)=
0ELSEPRINT"YOU CANNOT DO THAT"
85 GOTO4
86 IFO(10)<150THENPRINT"YOU HAVE
 NO SHOVEL"ELSEIFR<>60THENPRINT"
NO EFFECT"ELSEIFP(4)=1ANDP(5)=1T
HENIFP(6)=1THENPRINT"YOU MADE A
HOLE IN THE CASKET   WALL. THE L
OOSE DIRT ALLOWED YOUTO DIG TO T
HE SURFACE.":R=71:GOSUB14ELSEPRI
NT"THE SIDES ARE TOO HARD."
87 GOTO4
88 IFO(9)<150THENPRINT"YOU HAVE
NO DRILL"ELSEIFP(4)<>1ORP(5)<>1O
RR<>60THENPRINT"WHAT A NICE ROUN
D HOLE YOU HAVE MADE"ELSEIFP(0)=
2THENPRINT"A DRAFT OF AIR EXTING
UISHES YOURMATCH":P(6)=1ELSEPRIN
T"TOO DARK"
89 GOTO4
90 IFO(N)<>150THENPRINT"YOU DO N
OT HAVE IT TO THROW"ELSEIFN<>15O
RR<>134THENPRINT"GOOD THROW.":GO
TO49ELSEPRINT"YOU HAVE APPARENTL
Y HAD PRACTICETHE ROPE IS TIGHTL
Y HOOKED ON   THE BRANCH ABOVE."
:P(8)=1:O(15)=134:P(3)=P(3)-1
91 GOTO4
92 IFN<16ANDO(N)<150THENPRINT"YO
U DO NOT HAVE THAT":GOTO4ELSEIFN
>15ANDO(N)<>R THENPRINT"THAT IS
NOT HERE":GOTO4
93 IFN=1THENPMODE2,1:PCLS5:PMODE
4,1:PRINT"IT IS A NOTE FROM GEOR
GE RUBIX..A NERVOUS BUT FRIENDLY
 GUARD.":PRINT@0,"I KNOW YOU ARE
 INNOCENT AND HAVEA PLAN FOR YOU
R ESCAPE.";ELSE95
94 PRINT" GET THE OXYGEN MASK FR
OM THE INFIRMARY. THEN GO TO THE
 MORGUE AND HIDE  IN AN OPEN CAS
KET. YOU WILL BE  BURIED BUT I W
ILL COME DIG YOU  UP. YOUR CELL
DOOR IS UNLOCKED. PLEASE DESTROY
 THIS NOTE.":GOTO4
95 IFN=2THENPMODE2,1:PCLS0:PMODE
4,1:PRINT"THE LIST SAYS...":P=0:
FORK=1TOLEN(V$)STEP3:PRINT@P,MID
$(V$,K,3);:P=P+4:NEXT:GOTO4
96 IFN=16THENIFU=3THENPRINT"ETCH
ED ON THE WINDOW IS...":PRINT@10
9,"WARDEN";:GOTO4ELSEPRINT"YOU A
RE NOT FACING IT"
```

```
97 IFN=12THENPRINT"IT SAYS... ME
DICALERT. I WEAR  CONTACT LENSE
S.","GEORGE RUBIX"ELSEIFN=30THEN
PRINT"IT SAYS... DANGER. HIGH VO
LTAGE."ELSEPRINT"THERE IS NOTHIN
G TO READ."
98 GOTO4
99 IFAN$<>"GUN "ANDN<>3THENPRINT
"YOU CAN ONLY SHOOT GUNS":GOTO4E
LSEIFO(3)<>150THENPRINT"YOU HAVE
 NO GUN.":GOTO4ELSEIFP(1)=0THENP
RINT"YOUR GUN IS EMPTY":GOTO4ELS
EP(1)=0
100 INPUT"AT WHAT ARE YOU AIMING
";A$:IFA$="LOCK"ANDR=69THENIFU<>
3THENPRINT"YOU ARE NOT FACING IT
":P(1)=1:GOTO4ELSEPRINT"THE PADL
OCK FALLS TO THE FLOOR  AND THE
DOOR SWINGS OPEN":P(18)=1:D(69)=
3:GOTO14
101 IFA$="SPIDER"THENPRINT"YOUR
SHOT GREATLY ALARMED THE   SPIDE
R WHO INJECTED YOU WITH A  DEADL
Y POISON":GOTO178
102 PRINT"YOU SHOULD NOT PLAY WI
TH GUNS":GOTO4
103 INPUT"ARE YOU SURE ";A$:A$=L
EFT$(A$,1):IFA$="Y"THEN179ELSE4
104 INPUT"SAVE TO DISK OR TAPE O
R ABORT ";A$:A$=LEFT$(A$,1):IFA$
="A"THEN4ELSEIFA$="D"THENDN=1ELS
EDN=-1:PRINT@448,"POSITION TAPE.
 PRESS PLAY=RECORDAND PRESS <ENT
ER>.";:INPUTA$
105 PRINT@0,"SAVING";:GOSUB187
106 OPEN"O",DN,"ZONEDATA":PRINT#
DN,R;O$(2):PRINT#DN,MID$(N$,5,4)
:FORK=0TO18:PRINT#DN,P(K);:NEXT:
FORK=1TO140:PRINT#DN,D(K);:NEXT:
FORK=1TO37:PRINT#DN,O(K);:NEXT:C
LOSE
107 EXEC32211:GOTO4
108 IFAN$="GUN "ORN=3THENIFO(3)<
150THENPRINT"YOU HAVE NO GUN":GO
TO4ELSEIFO(4)<150THENPRINT"YOU H
AVE NO AMMO":GOTO4ELSEP(1)=1:PRI
NT"CHAMBER IS LOADED":GOTO4
109 INPUT"LOAD FROM DISK OR TAPE
 OR ABORT";A$:A$=LEFT$(A$,1):IFA
$="A"THEN4ELSEIFA$="D"THENDN=1EL
SEDN=-1:PRINT@448,"POSITION TAPE
. PRESS PLAY AND   PRESS ENTER."
;:INPUTA$
110 PRINT@0,"LOADING";:GOSUB187
111 OPEN"I",DN,"ZONEDATA":INPUT#
DN,R,O$(2),O$:FORK=0TO18:INPUT#D
N,P(K):NEXT:FORK=1TO140:INPUT#DN
,D(K):NEXT:FORK=1TO37:INPUT#DN,O
(K):NEXT:CLOSE:MID$(N$,5,4)=O$
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```
112 EXEC32211:GOTO14
113 ONRND(4)GOTO114,115,116,117
114 PRINT"YOU ARE ON YOUR OWN.":
GOTO4
115 PRINT"ARE YOU SURE YOU ARE C
UT OUT FORTHIS.":GOTO4
116 PRINT"YOU ARE TRAVELING IN A
 DIFFERENTDIMENSION.":GOTO4
117 PRINT"YOUR SOLUTION IS THE K
EY TO THE IMAGINATION.":GOTO4
118 X=0:PMODE2,1:PCLS5:PMODE4,1:
PRINT@0,"YOU HAVE";:FORK=1TO36:I
FO(K)>149THENPRINTTAB(11)O$(K):X
=1
119 NEXT:IFX=0THENPRINTTAB(11)"N
OTHING."
120 GOTO7
121 IFO(N)<150THENPRINT"YOU DO N
OT HAVE THAT":GOTO4ELSEIFN<>11TH
ENPRINT"YOU CANNOT TURN "AV$" TH
AT":GOTO4ELSEIFV=26THENIFO(11)=2
00THENPRINT"OK":O(11)=150ELSEPRI
NT"ALREADY OFF"
122 IFV=27THENIFO(11)=150THENPRI
NT"OK":O(11)=200ELSEPRINT"ALREAD
Y ON"
123 GOTO14
124 IFN=21ANDR=52THENLINE(139,8)
-(165,36),PSET,BF:CIRCLE(152,22)
,3,5:O(22)=R ELSEPRINT"THAT HAD
NO EFFECT"
125 GOTO4
126 IFO(N)<>150THENPRINT"YOU DO
NOT HAVE THAT"ELSEIFN=1THENPRINT
"GOOD IDEA. THEY WILL NEVER FIND
 THE "AN$" ON YOU.":O(1)=145ELSE
PRINT"THAT COULD BE DANGEROUS. B
ESIDESYOU ARE NOT EVEN HUNGRY."
127 GOTO14
128 IFN=23ANDR=53THENPRINT"A DOO
RWAY IS REVEALED!":D(53)=9:P(14)
=0:GOTO35
129 PRINT"BE CAREFUL. YOU MIGHT
HURT YOUR BIG TOE.":GOTO4
130 IFO(N)<>150THENPRINT"YOU DO
NOT HAVE IT":GOTO4ELSEIFN<>12ORR
<>131THEN132ELSEIFO(14)=150THENP
RINT"THE SPIDER WAS DISTRACTED B
Y ITSSHINE LONG ENOUGH FOR YOU T
O CUTYOURSELF LOOSE AND ESCAPE":
R=132:O(12)=-1:P(3)=P(3)-1:GOTO1
4
131 PRINT"THE SPIDER WAS MOMENTA
RILY DIS= TRACTED; BUT WITHOUT A
 KNIFE YOUCANNOT ESCAPE":GOTO178
132 PRINT"I WOULD NOT ADVISE THA
T":GOTO4
133 P(2)=P(2)-1:PRINT"YOUR SCORE
 IS"P(2)" MOVES.":GOTO4
```

```
134 Q$=INKEY$:IFQ$="^"THENY=Y-30
ELSEIFQ$=CHR$(10)THENY=Y+30ELSEI
FQ$=CHR$(8)THENX=X-24ELSEIFQ$=CH
R$(9)THENX=X+24ELSEIFQ$=CHR$(13)
THENRETURN
135 IFY<10THENY=10ELSEIFY>40THEN
Y=40
136 IFX<24THENX=24ELSEIFX>216THE
NX=216
137 POKE178,K:LINE(X,Y)-(X+4,Y+4
),PSET,BF:POKE178,Z:LINE(X,Y)-(X
+4,Y+4),PSET,BF:GOTO134
138 IFX<1THEN188ELSEPOKE491,X:IF
P(5)=1ANDR=60THENPMODE2,1:PCLS0:
PMODE4,1ELSEEXEC32714
139 GOTO16
140 FORX=40TO220STEP180:CIRCLE(X
,80),16,0,.3,0,.5:CIRCLE(X,80),8
,0,.3,0,.5:CIRCLE(X,64),16,0,.3,
0,.5:CIRCLE(X,60),16,0,.3:PAINT(
X,60),0,0:N=X-14:DRAW"BM=N;,80E2
R2F2M-8,-16NU4BR32NU4M-8,+16E2R2
F2":NEXT
141 DRAW"C0BM128,90R5E5U32G5L5H5
D32NF5BU4M-48,-24D2M-4,-2U26M+4,
+2ND24M+48,+20BR15M+45,-27D24NM-
45,+32D2M+4,-2U25NM-4,+2U2H2M-54
,-14L2M-57,+20G2D2BR16M+40,+16R8
M+38,-22M-40,-12L2M-44,+16D2H2U2
M+46,-17RM+42,+12D2G2"
142 DRAW"BM0,60M+70,-20BR118BU8M
+68,+6":POKE178,1:PAINT(2,90),,0
:PAINT(128,30),,0:POKE178,60:PAI
NT(100,50),,0:PAINT(150,60),,0:P
AINT(130,60),,0:POKE178,2:PAINT(
40,70),,0:PAINT(220,70),,0:PAINT
(130,55),,0:PAINT(2,90),,0:POKE1
78,64:PAINT(2,2),,0
143 GOTO16
144 PMODE1,1:PCLS6:PMODE4,1:DRAW
"BM0,85C0M+101,-25NU60M+155,+30"
:IFO(12)=R THENCIRCLE(100,70),9,
5,.5
145 GOTO16
146 DRAW"BM0,85C0M+100,-25NU60M+
136,+35"
147 FORX=0TO100STEP8:LINE(X,85-X
/4)-(100,X*.6),PSET:LINE(X+4,85-
(X+4)/4)-(0,85-(X+4)*.6),PSET:NE
XT:FORX=0TO112STEP8:LINE(0,X*.7)
-(X*.85,0),PSET:NEXT:FORX=20TO0S
TEP-5:LINE(100,X+35)-(0,X),PSET:
NEXT:FORX=0TO100STEP12:LINE(X,0)
-(100,35-.35*X),PSET:NEXT
148 FORX=0TO96STEP8:LINE(100,.6*
X)-(100+X,0),PSET:LINE(X+100,60+
X/4)-(100,60-.6*X),PSET:NEXT:FOR
X=104TO136STEP8:LINE(X+100,60+X/
4)-(X,0),PSET:NEXT:FORX=142TO155
```

```
STEP6:LINE(X+100,95)-(X,0),PSET:
NEXT:FORX=160TO250STEP6:LINE(X,0
)-(255,250-X),PSET:NEXT
149 FORX=4TO60STEP6:LINE(X+100,6
0+X/4)-(198+X,0),PSET:LINE(X+160
,74+X/4)-(255,X),PSET:NEXT:FORX=
0TO24STEP6:LINE(X+224,90+X/4)-(2
55,62+X),PSET:NEXT:POKE178,2:PAI
NT(128,90),,0:FORX=0TO6STEP3:POK
E178,X/3:LINE(30+X,20+X)-(60-X,4
0-X),PSET,BF:NEXT
150 GOTO16
151 FORX=0TO255STEP2:DRAW"BM=X;,
25C0U10U"+STR$(RND(15))+"BM=X;,3
5RU10U"+STR$(RND(15))+"BM=X;,95R
M+"+MID$(STR$(RND(3)),2)+",-"+MI
D$(STR$(RND(20)+25),2)+"BM=X;,95
RU10U"+STR$(RND(10)):NEXT
152 POKE178,1:PAINT(2,50),,0:FOR
X=1TO100:PRESET(RND(255),RND(10)
+25):NEXT
153 GOTO16
154 DRAW"BM0,75C0R255U50H20L10G1
0L70M-100,+30L45":CIRCLE(180,65)
,40,0,1,.46,.05:PAINT(2,2),0,0:P
OKE178,1:PAINT(2,70),,0:POKE178,
2:PAINT(2,90),,0
155 FORX=1TO10:CIRCLE(40,20),X,5
:NEXT:FORX=1TO100:PRESET(RND(255
),RND(20)+75):PSET(RND(255),RND(
75),5):NEXT:PAINT(180,65),0,0:PA
INT(2,70),0,0
156 DRAW"BM0,75C0R255":CIRCLE(18
0,65),40,0,1,.46,.05:GOTO16
157 DRAW"BM0,65C0M+73,-10E2R2U2E
2R2U2E2R2U2E44R4F44F2R2D2F2R2D2F
2R2D2M255,75":CIRCLE(128,75),60,
0,.2:CIRCLE(128,78),60,0,.2,.5,1
:POKE178,2:PAINT(128,90),,0
158 POKE178,1:PAINT(128,75),,0:P
AINT(2,2),0,0:PAINT(250,2),0,0:P
MODE3,1:FORK=0TO7:D=8*K+4:X=126-
K*8:Y=136+K*8:DRAW"BM=X;,0C6D=D;
BM=Y;,0D=D;":NEXT:DRAW"BM+20,+4U
65BR30D74BM-224,-12U70BR30D60":P
MODE4,1
159 GOTO16
160 PMODE2,1:PCLS0:PMODE4,1:DRAW
"BM128,48C5NU48NE48NR96NF48ND48N
G48NL96NH48":FORK=0TO48STEP8:Y=4
8-K:DRAW"BM128,=K;R=Y;F=Y;G=Y;L=
Y;L=Y;H=Y;E=Y;R=Y;":NEXT
161 GOTO16
162 PMODE2,1:PCLS0:PMODE4,1:GOTO
16
163 DRAW"BM128,70C0M-50,-30M+16,
-6F36U40NM-36,+4M+36,+4G36M+50,-
30NH10M-16,-6H12NM+18,+8M-22,-2N
D10M-22,+2NG12M-20,+8G10":POKE17
8,1:PAINT(2,2),,0:PMODE4,1
164 GOTO16
165 PRINT@37,1;TAB(69)2;TAB(70)"
B";:FORK=18TO66STEP24:CIRCLE(50,
K),10,0:NEXT:PRINT@266,R$(R(R)):
PRINT@298,STRING$(10,32):PRINT@2
98,"";:IFR=31THENPRINT"N"ELSEPRI
NT"E"
166 PRINT@416,"WHICH FLOOR <1;2;
B>";:INPUTA$:IFA$="2"THENPRINT"A
 HOST OF GUARDS AWAITS YOU.":GOT
O178ELSEIFA$="1"THENIFR=32THENR=
31:PRINT"UP WE GO..."ELSEPRINT"Y
OU WERE ON THE FIRST FLOOR"
167 IFA$="B"THENIFR=31THENR=32:P
RINT"DOWN WE GO..."ELSEPRINT"YOU
 WERE ALREADY IN THE BASEMENT"
168 GOTO4
169 H=0:PMODE2,1:PCLS0:PMODE3,1:
DRAW"BM0,95C6R255BM5,90U50E40R16
5F40D50L245":PAINT(2,2),6,6:X=12
8:Y=86
170 PRINT@266,R$(R(R))
171 PRINT@416,"YOU HAVE ENTERED
THE LASER OB=  STACLE COURSE. YO
U MUST TRAVERSETHIS DANGEROUS CO
URSE.":FORK=1TO2000:NEXT:PRINT@4
16,"USE THE 4 ARROW KEYS TO GET
THE WHITE CURSOR TO THE TOP OF T
HE  SCREEN. PRESS <ENTER>";:INPU
TA$
172 A=RND(165)+45:B=RND(165)+45
173 A$=INKEY$:IFA$=CHR$(8)THENX=
X-2ELSEIFA$=CHR$(9)THENX=X+2ELSE
IFA$=CHR$(10)THENY=Y+2ELSEIFA$=C
HR$(94)THENY=Y-2
174 IFY<4THENPRINT@416,STRING$(6
4,32)"CONGRATULATIONS; YOU MADE
IT":R=22:GOTO14ELSEIFPPOINT(X,Y)
<>5THEN172ELSEPSET(X,Y,8):DRAW"B
M=A;,0C7D=Y;BM=B;,0D=Y;":PRESET(
X,Y)
175 DRAW"BM=A;,0C5D=Y;BM=B;,0D=Y
;":IFA=X THEN177
176 GOTO172
177 H=H+1:IFH=1THENPRINT@224,"WO
UNDED":GOTO172ELSEIFH=2THENPRINT
@224,"FATALLY WOUNDED":GOTO178
178 FORK=1TO5:PLAYT$:NEXT
179 PCLS5:POKE491,10:EXEC32714:P
RINT@288,"FOR YOU THIS ADVENTURE
 IS OVER.",,,:INPUT"CARE TO PLAY
 AGAIN";A$:IFLEFT$(A$,1)="N"THEN
POKE113,0:EXEC40999ELSE2
180 PMODE2,3:PCLS5:PMODE4,1:PRIN
T@256,"THE JEWEL BRINGS ONLY DOO
M TO   THOSE WHO POSSESS IT. GEO
RGE IS TRAPPED FOR ETERNITY IN T
HE POOL":FORK=1TO5:PLAYT$:NEXT
```

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```
181 PRINT"YOU NOW RETURN TO CIVI
LIZATION  WITH THE CASKET NOTE P
ROVING    YOUR INNOCENCE":FORK=1
TO5:PLAYT$:NEXT
182 PMODE2,3:PCLS5:PMODE4,1:PRIN
T@256,"GEORGE WAS NEVER FOUND. I
T WAS  ASSUMED HE ESCAPED TO SOU
TH","AMERICA.":FORK=1TO5:PLAYT$:
NEXT
183 PRINT:PRINT"BUT YOU KNOW GEO
RGE HAS ESCAPED TO A PLACE BEYON
D SPACE AND","TIME. A PLACE KNOW
N AS THE...":FORK=1TO5:PLAYT$:NE
XT
184 PCLS5:POKE491,10:EXEC32714:P
RINT@288,"YOU HAVE WON THE ADVEN
TURE","IN"P(2)"MOVES":PRINT:PRIN
T"CARE TO PLAY AGAIN?"
185 A=RND(235)+10:B=RND(25)+10:F
ORK=5TO0STEP-5:FORX=1TO10:DRAW"B
M=A;,=B;C=K;NU=X;NE=X;NR=X;NF=X;
ND=X;NG=X;NL=X;NH=X;":NEXTX,K
186 A$=INKEY$:IFA$="Y"THEN2ELSEI
FA$="N"THENPOKE113,0:EXEC40999EL
SE185
187 POKE360,PEEK(492):POKE361,PE
EK(493):POKE363,PEEK(494):POKE36
4,PEEK(495):POKE32211,48:RETURN:
'get initial ram hooks
188 FORK=0TO3:Z=84-12*K:FORW=2TO
0STEP-1:ONW+1GOSUB189,192,195:NE
XTW,K:GOTO16
189 IF(D(R+K*C)ANDW(0))<>W(0)THE
NX=223:GOSUB197:X=192-64*K:DRAW"
BD6L=X;D=Z;R=X;U=Z;":K=4
190 RETURN
191 'right walls
192 X=254:GOSUB197:IF(D(R+K*C)AN
DW(1))=W(1)THENDRAW"BD6L32D=Z;R3
2"ELSEDRAW"M-32,+6;D=Z;M+32,+6"
193 RETURN
194 'left walls
195 X=0:GOSUB197:IF(D(R+K*C)ANDW
(2))=W(2)THENDRAW"BD6R32D=Z;L32"
ELSEDRAW"M+32,+6;D=Z;M-32,+6"
196 RETURN
197 DRAW"BM"+STR$(ABS(X-32*K))+"
,"+STR$(6*K):RETURN
198 '
199 FORK=0TO24:READR$(K):NEXT:DA
TAA JAIL CELL,A HALL,AN EMPTY RO
OM,ARSENAL,STORAGE ROOM,INFIRMAR
Y,WARDEN'S OFFICE,SHOP,KITCHEN,I
SOLATION WARD,MORGUE,FIELD,RIVER
 BANK,SAUNA ROOM,HOT TUB,A LONEL
Y ROAD
200 DATA CAVE OPENING,TUNNEL,PIT
,CLEARING,A CAVERN,WEB,POOL,ELEV
ATOR,LASER TEST ROOM
201 FORK=0TO140:READD(K),R(K):NE
XT:DATA2,,2,,3,1,3,1,3,1,7,1,3,1
,3,1,7,1,3,1,0,0,2,1,7,1,7,1,1,1
,14,1,3,1,2,1,14,1,3,1,5,1,2,24,
11,1,11,1,1,8,14,1,3,1,5,1,10,1,
1,3,12,1
202 DATA8,23,2,23,3,1,3,1,15,1,1
,4,10,1,3,1,3,1,9,1,6,1,3,1,7,1,
7,1,11,1,3,1,7,1,3,1,7,1,1,5,8,1
,2,6,8,2,12,1,2,2,3,1,15,1,1,2,1
0,1,1,10,2,2,3,1,3,1,9,1,2,7,3,1
,11,1,3,1,1,1,1,9
203 DATA6,11,7,11,7,15,7,11,7,11
,7,11,7,11,1,12,7,11,5,11,14,11,
15,11,15,15,15,11,15,11,15,11,15
,11,1,12,15,11,13,11,10,11,11,11
,11,15,11,15,11,15,11,15,11,11,1
,12,15,11,13,11,2,17,3,17,3,17,7
,17,7,17,3,16,3,15,3,15,11,15,13
,13
204 DATA,14,2,17,7,17,15,17,13,1
7,6,17,5,17,6,17,1,20,12,15,6,17
,3,17,11,17,11,17,9,17,10,17,13,
17,12,17,,22,12,15,,21,2,17,2,17
,,18,3,17,9,17,10,17,11,17,1,17,
8,19
205 FORK=1TO37:READO$(K),O(K):NE
XT
206 DATANOTE,1,PAPER,7,RIFLE,-1,
AMMO,-1,MASK,-1,BOTTLE,-1,KEY,-1
,MATCHES,24,DRILL,-1,SHOVEL,-1,F
LASHLIGHT,100,BRACELET,111,CONTA
CT,106,KNIFE,112,ROPE,123
207 DATAWINDOW,9,GUNCASE,29,CABI
NET,50,BOX,-1,DOOR,9,PICTURE,52,
SAFE,-1,PANEL,53,CASKET,60,TOOLS
,65,RIVER,78,HOT TUB,110,GAS,-1,
LINK FENCE,140,SIGN,-1,SPIDER,13
1,WEB,131,PIT,134,POOL,119,BLOOD
,135,CUPBOARDS,36,JEWEL,129
208 V$="LOOEXAGETTAKSTRPUTDROOPE
JUMSWICLOGO CLIUNLLOCDIGDRITHRRE
ASHOQUISAVLOAHELINVOFFON MOVEATK
ICGIVSCO"
209 N$="NOTEPAPERIFLAMMOMASKBOTT
KEY MATCDRILSHOVFLASBRACCONTKNIF
ROPEWINDGUNCCABIBOX DOORPICTSAFE
PANECASKTOOLRIVETUB GAS FENCSIGN
SPIDWEB PIT POOLBLOOCUPBJEWE"
210 V(1)=8:V(2)=4:V(3)=2:V(4)=1:
S$="ARSSTOINFMORWARSHOKITFIEA LS
AUHOTCLERIVCAVA CWEBPITPOOELELAS
":K=RND(-TIMER):FORK=15TO17:P(K)
=RND(35):NEXT
211 PMODE4,1:COLOR0,5:SCREEN1,1:
T$="T5L8O4GP8G#P8GP8EP8":FORK=1T
O6:PLAYT$:NEXT:P(10)=RND(9)*24:P
(14)=2:PCLS5:CLS:R=2:A$="W":GOTO
8
```

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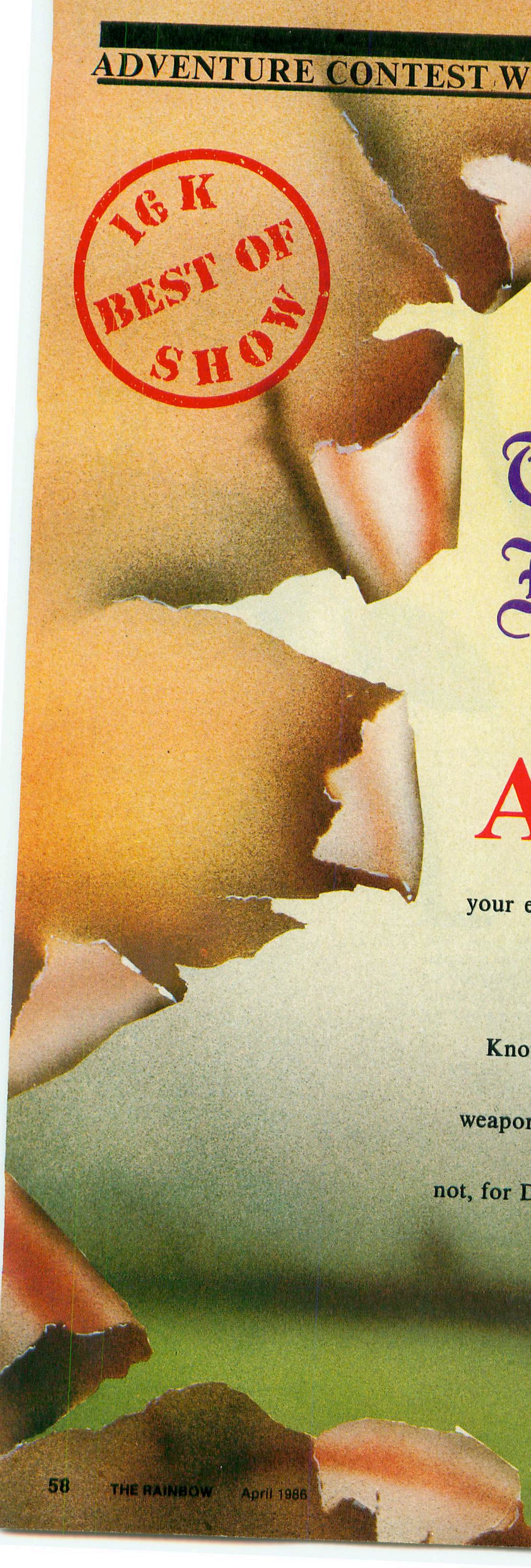

16 K BEST OF SHOW

You must solve the secret of this mysterious maze to save the people of your village . . .

The Maze of Moycullen

Program by Thomas E. Riley

As Muhra, leader of the Catella Village, you and your entire family have been captured and taken prisoner by the vile Doghedra and his barbaric warriors. Knowing you as peaceful people who never carry defense weapons, the capture was harmless. But, the intentions were not, for Doghedra has planned your imprisonment to help his village prosper. And, if the scheme works, he will reign supreme.

16K ECB

Since the people of your village are extremely agricultural, and Doghedra's are not, his first demand is for your people to grow sufficient grain and produce to feed his pernicious tribe through the winter. Second, the first-born daughters from each family of your village must be brought to his camp to become subservient wives for his warriors. Finally, 20 of your strongest men will have to go to work in Doghedra's mines, and for each man that dies, one will be chosen to replace him. If all demands are met, you and your family will be freed. If not, all of you will encounter a torturous death.

Your family, although distressed, knows since you are a proud representative of your village, that Doghedra's demands will never be met. But, they do not know that you are only one of a few who remembers the long-forgotten custom of these warriors. Fortunately, Doghedra is another who knows that a condemned man is permitted to request a challenge. To honor the custom, your plea is granted.

Of course, the request does not disturb the fearless leader; if you survive the challenge he has in mind you will make him the richest and most powerful leader of the land, for you are to enter the maze of Moycullen to recover the treasure within.

The maze was built generations ago by a powerful race of people to safeguard their riches. But, the entire race was annihilated during war, leaving no one to pass on the secret of the maze.

Doghedra has you just where he wants you. Since hundreds of his strongest warriors were never seen again after entering the maze, he knows whatever happens, satisfaction will be his reward. However, surviving the maze and recovering the treasure is the only way to save your family.

Thomas Riley is an auditor for the state of New York. His main interests in software are business applications and games. Developing educational software for his son is his next goal.

Loading and Playing Instructions

The Maze of Moycullen is a text Adventure that runs on a 16K Color Computer by entering `POKE25,6:NEW` before loading. The command is needed to clear sufficient memory for the program.

Traveling through the maze and performing the necessary task is simplified with the use of one-letter directional commands, as well as verb and noun responses. For example, enter 'N' to GO NORTH, or 'T' for TAKE, then 'A' for APPLE to take the apple when prompted with TAKE WHAT?

A bird's-eye view of each room is graphically displayed in the upper left corner of the screen. In all the rooms, the floor is shown in black, while the walls are depicted in blue and buff. By viewing the graphics display, an available exit can easily be chosen.

All valid verbs are displayed in the upper right section of the screen as are the items in the player's possession. The bottom half of the screen prints the activities of the occupied room, any objects within the room and in the player's possession, and prompts the player for the one-letter commands.

(Any questions regarding *The Maze of Moycullen* may be directed to Mr. Riley at RD #1, Box 144F1, Johnsonville, NY 12094. Please include an SASE when writing for a reply.) ☐

— Jutta Kapfhammer and Philip Helm
Adventure Contest Judges

100	124
1250	114
1430	9
2100	26
2170	1
2302	187
2368	206
2460	237
3140	120
3302	17
3365	147
3430	195
4220	229
4250	206
4285	143
5100	16
5225	121
5295	119
50000	211
50940	209
END	253

16K users, before loading: `POKE25,6:NEW`

The listing: `MOYCULEN`

```
1 CLS:PRINT@108,"THE MAZE":PRINT
@170,"OF MOYCULLEN":PRINT@234,"B
Y TOM RILEY"
2 TD$=CHR$(128):FOR Y=331TO338:P
RINT@Y,TD$;:NEXTY:PRINT@340,TD$;
:PRINT@365,TD$;:PRINT@369,TD$;:P
RINT@372,TD$:PRINT@395,TD$;:PRIN
T@397,TD$;:PRINT@399,TD$;:PRINT@
401,TD$;:PRINT@403,TD$;TD$
3 PRINT@427,TD$;:PRINT@431,TD$;:
PRINT@436,TD$;:FOR Y=459 TO 468:
PRINT@Y,TD$;:NEXTY
4 PLAY"O3L8CDL4.EL8DL4CCDCO2L2AL
4GL2EL4GAL16AGAO3CL2DL8CDL2EL4DL
2CL4EL2O2AO3L4CO2L2GL4O3CL2O2EL4
DL2CO3L4CO2L2GO3L4CO2L2EO3L8CO2B
O3L2CO2L4BO3L2.CL2C"
5 READ D:PRINT@D,"*";:PLAY"L4B":
PRINT@D," ";:IF D=339THENGOTO10E
LSEGOTO5
7 DATA363,364,396,428,429,430,39
8,366,367,368,400,432,433,434,40
2,370,371,339
10 CLS:GOSUB50000:PRINT@7,"N";:P
RINT@97,"W";:PRINT@109,"E";:PRIN
T@231,"S";:PRINT@258,"I SEE";
100 GG=0:BB=0:JJ=0:RR=0:AA=0:OO=
0:MM=0:FF=0:UU=0:NS$="NOTHING SP
ECIAL":IM$="NOT A VALID MOVE":W$
=CHR$(175):P$=CHR$(207):YC$="YOU
 CAN'T TAKE THAT":YK$="YOU CAN'T
 KILL THAT"
1100 GOSUB50800
1102 GOSUB50500
1104 GOSUB50200
1106 GOSUB50300
1108 GOSUB50900
```

```
1110 PRINT@290,NS$:GOSUB60000
1120 IF Z$="N"THENGOTO2100ELSEIF
 Z$="E"THENGOTO1200ELSEPRINT@353
,IM$:PLAY"L4AB":PRINT@352," ":GO
TO1110
1200 GOSUB50700
1202 GOSUB60100
1204 GOSUB50900
1206 GOSUB50200
1210 IF FF=0THENPRINT@290,"FLAMI
NG TORCH"ELSEPRINT@290,NS$
1215 GOSUB60000
1220 IF Z$="N"THENGOTO2200ELSEIF
 Z$="E"THENGOTO1300ELSEIF Z$="W"
THENGOTO1100
1230 IF Z$="T"ANDFF=0THENPRINT@3
53,"TAKE":PRINT@385,"what";:GOTO
1250ELSEIF Z$="T"THENPRINT@353,"
THERE IS NOTHING TO TAKE":PLAY"L
4AB":PRINT@353," ":GOTO1210
1240 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO1210
1250 GOSUB60010
1260 IF Z$="F"THENPRINT@385,"FLA
MING TORCH":PRINT@417,"FLAMING T
ORCH TAKEN":FF=1:PLAY"L4CD":GOTO
1270ELSEPRINT@385,YC$:PLAY"L4AB"
1270 PRINT@353," ":PRINT:PRINT:G
OTO1204
1300 GOSUB50800
1302 GOSUB50100
1304 GOSUB50900
1306 GOSUB50200
1310 PRINT@290,NS$:GOSUB60000
1320 IF Z$="E"THENGOTO1400ELSEIF
 Z$="W"THENGOTO1200ELSEPRINT@353
,IM$:PLAY"L4AB":PRINT@353," ":GO
TO 1310
1400 GOSUB50500
1402 GOSUB50700
1404 GOSUB50200
1406 GOSUB50400
1408 GOSUB50900
1410 IF UU=0THENPRINT@290,"UGLY
CYCLOPS"ELSEPRINT@290,"DEAD CYCL
OPS"
1415 GOSUB60000
1420 IF Z$="N"ANDUU=1THENGOTO240
0ELSEIF Z$="N"THENGOTO1450
1425 IF Z$="W"ANDUU=1THENGOTO130
0ELSEIF Z$="W"THENGOTO1450
1430 IF Z$="K"ANDUU=0THENGOTO146
0ELSEIF Z$="K"THENPRINT@353,"SHE
 IS ALREADY DEAD":PLAY"L4AB":PRI
NT@353," ":GOTO1410
1440 PRINT@353,IM$:PLAY"L4AB":PR
```

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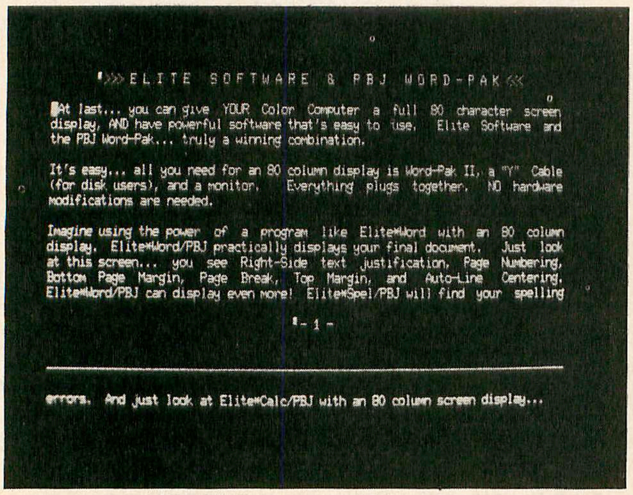

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                              - 1 -

______________________________________________________________________________

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```

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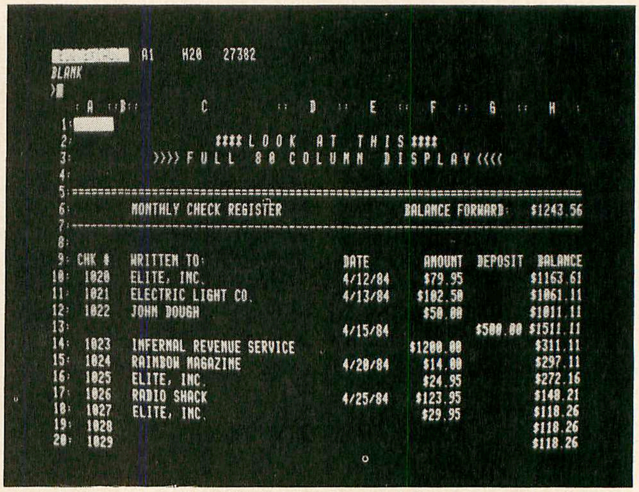

```
          A1    H20   27382
BLANK
>
   A  B        C          D     E     F     G     H
 1:
 2:                   ****L O O K   A T   T H I S****
 3:           >>>>F U L L   8 0   C O L U M N   D I S P L A Y<<<<
 4:
 5:==========================================================================
 6:        MONTHLY CHECK REGISTER                      BALANCE FORWARD:  $1243.56
 7:--------------------------------------------------------------------------
 8:
 9: CHK #  WRITTEN TO:                   DATE       AMOUNT  DEPOSIT  BALANCE
10:  1020  ELITE, INC.                   4/12/84    $79.95           $1163.61
11:  1021  ELECTRIC LIGHT CO.            4/13/84   $102.50           $1061.11
12:  1022  JOHN DOUGH                               $50.00           $1011.11
13:                                      4/15/84            $500.00  $1511.11
14:  1023  INFERNAL REVENUE SERVICE               $1200.00            $311.11
15:  1024  RAINBOW MAGAZINE              4/20/84    $14.00            $297.11
16:  1025  ELITE, INC.                              $24.95            $272.16
17:  1026  RADIO SHACK                   4/25/84   $123.95            $148.21
18:  1027  ELITE, INC.                              $29.95            $118.26
19:  1028                                                             $118.26
20:  1029                                                             $118.26
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```
INT@353," ":GOTO1410
1450 PRINT@353,"BEFORE YOU CAN E
SCAPE, THE     CYCLOPS SEPERATES
 YOUR HEAD     FROM YOUR NECK. T
OO BAD";:PLAY"L1O4CO3CO2C":CLS:G
OTO2260
1460 PRINT@353,"KILL":PRINT@385,
"what";:GOSUB6010
1470 IF Z$="U"THENGOTO1480ELSEPR
INT@385,YK$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO1410
1480 PRINT@385,"UGLY CYCLOPS":PR
INT@417,"WITH what";:GOSUB6010
1490 IF Z$="B"ANDBB=1THENGOTO149
5ELSEIF Z$="B"THENPRINT@417,"YOU
 DON'T HAVE THAT":PLAY"L4AB":PRI
NT@353," ":PRINT:PRINT:GOTO1410
1492 IF Z$="F"AND FF=1THEN GOTO1
495ELSE IF Z$="F"THEN PRINT@417,
"YOU DON'T HAVE THAT":PLAY"AB":P
RINT@353," ":PRINT:PRINT:GOTO141
0 ELSE PRINT@417,"THAT WON'T WOR
K":PLAY"AB":PRINT@353," ":PRINT:
PRINT:GOTO1410
1495 IF Z$="B"THEN PRINT@422,"BR
OADSWORD":UU=1:PLAY"O3CO1CO2C":P
RINT@353," ":PRINT:PRINT:GOTO141
0 ELSE PRINT@353,"YOU MANAGE TO
START HER CLOAK  ON FIRE.  A VER
Y ANGRY CYCLOPS  PROCEEDS TO EAT
 YOU ALIVE":PLAY"L1O4AO1AO2A":CL
S:GOTO2260
2100 GOSUB5060
2102 GOSUB6040
2104 GOSUB5060
2110 IF RR=0THENPRINT@290,"RATS"
ELSEPRINT@290,"BURNED RATS"
2115 GOSUB6000
2120 IF Z$="N"ANDRR=0THENGOTO215
0ELSEIF Z$="N"THENGOTO3100ELSEIF
 Z$="S"ANDRR=0THENGOTO2150ELSEIF
 Z$="S"THENGOTO1100ELSEIF Z$="E"
THENGOTO2200
2140 IF Z$="K"ANDRR=0THENGOTO216
0ELSEIF Z$="K"THENPRINT@353,"THE
RE IS NOTHING TO KILL":PLAY"L4AB
":PRINT@353," ":GOTO2110
2145 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO2110
2150 PRINT@353,"BEFORE YOU CAN L
EAVE, THE RATS SURROUND YOU.  AS
 YOU ARE       DEVOURED, YOU THI
NK - 'MY POOR  FAMILY'";:PLAY"L1
GFGL4GFG":CLS:GOTO2260
2160 PRINT@353,"KILL":PRINT@385,
"what";:GOSUB6010
2170 IF Z$="R"THENGOTO2180ELSEPR
INT@385,YK$:PLAY"L4AB":PRINT@352
," ":PRINT:GOTO2110
2180 PRINT@385,"RATS":PRINT@417,
"WITH what";:GOSUB6010
2190 IFZ$="F"ANDFF=1THENPRINT@42
2,"FLAMING TORCH":RR=1:PLAY"L2O1
CO2C":PRINT@353," ":PRINT:PRINT:
GOTO2110ELSEPRINT@417,"YOU DON'T
 HAVE THAT":PLAY"L4ABA":PRINT@35
2," ":PRINT:PRINT:PRINT:GOTO2115
2200 CLS:PRINT:PRINT"THE WALL SW
INGS AWAY AT YOUR     TOUCH.  AS
YOU STEP INTO THE     ROOM, YOUR
FOOT FAILS TO STRIKE ANY FLOOR.
 TOO LATE YOU REALIZEIT IS AN OP
EN SHAFT!"
2220 FOR X=1TO5000:NEXTX
2230 CLS(0):PLAY"L3O5CO4CO3CO2CO
1CL100O5AO2"
2240 CLS:PRINT:PRINT"YOUR SHATTE
RED BODY LIES AT THE BOTTOM OF A
 THIRTY-FOOT SHAFT.  YOUR LAST T
HOUGHT IS OF YOUR    FAMILY - WH
O WILL BE EXECUTED ATSUNDOWN."
2260 PRINT:PRINT:INPUT"DO YOU WI
SH TO TRY AGAIN (Y/N)";AN$
2280 IF AN$="Y"THENCLS:GOTO10ELS
EEND
2300 GOSUB5040
2302 GOSUB6030
2304 GOSUB5020
2306 GOSUB5090
2310 IF AA=1THENPRINT@290,NS$ELS
EPRINT@290,"ANGRY WIZARD"
2315 GOSUB6000
2320 IF Z$="W"THENGOTO2200ELSEIF
 Z$="N"ANDAA=1THENGOTO3300ELSEIF
 Z$="N"THENGOTO3355
2330 IF Z$="K"ANDAA=1THENPRINT@3
53,"THERE IS NOTHING TO KILL":PL
AY"L4AB":PRINT@353," ":GOTO2310E
LSEIF Z$="K"THENPRINT@353,"KILL"
:PRINT@385,"what";:GOTO2370
2340 IF Z$="C"ANDMM<>1THENPRINT@
353,"YOU HAVE NOTHING TO CAST":P
LAY"L4AB":PRINT@353," ":GOTO2310
ELSEIF Z$="C"THENPRINT@353,"CAST
":PRINT@385,"what";:GOTO2360
2350 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO2310
2360 GOSUB6010
2365 IF Z$="M"THENPRINT@385,"MAG
IC SPELL":MM=-1:PRINT@417,"THE W
IZARD IS IMMOBILIZED.":PLAY"L1CD
E":PRINT@353," ":PRINT:PRINT:PRI
NT@241,"             ";:GOTO2306
2368 PRINT@385,"YOU CAN'T CAST T
HAT":PLAY"L4AB":PRINT@353," ":PR
INT:GOTO2310
2370 GOSUB6010
2375 IF Z$="A"THENPRINT@385,"ANG
```

```
RY WIZARD":PRINT@417,"WITH what"
;:GOTO2380ELSEPRINT@385,YK$:PLAY
"L4AB":PRINT@353," ":PRINT:GOTO2
310
2380 GOSUB60010
2385 IF Z$="B"ANDMM=-1THENGOTO23
90ELSEPRINT@353,"BEFORE YOUR WEA
PON FINDS ITS   MARK, BOLTS OF E
NERGY FROM THE  WIZARD'S FINGERS
 TURN YOU AND   ALL YOUR POSSESS
IONS INTO ASH.":PLAY"L1O1BO2BL2O
1BO2BL4O1BO2B":CLS:GOTO2260
2390 PRINT@417,"BROADSWORD":AA=1
:PRINT@439,"WIZARD   VANISHES AS
 BLADE STRIKES HIM";:PLAY"L2O5EO
3EO1EO4EO2E":PRINT@353," ":PRINT
:PRINT:PRINT:GOTO2310
2400 GOSUB50600
2402 GOSUB50300
2404 GOSUB50900
2410 PRINT@290,"LIZARD":GOSUB600
00
2420 IF Z$="N"THENGOTO3400ELSEIF
 Z$="S"THENGOTO1400
2430 IF Z$="K"THENGOTO2450
2440 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO2410
2450 PRINT@353,"KILL":PRINT@385,
"what";:GOSUB60010
2460 IF Z$="L"THENGOTO2470ELSEPR
INT@385,YK$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO2410
2470 PRINT@385,"LIZARD":PRINT@41
7,"WITH what";:GOSUB60010
2480 IF Z$="B"THENPRINT@422,"BRO
ADSWORD":GOTO2490ELSEIF Z$="F"TH
ENPRINT@422,"FLAMING TORCH":GOTO
2490ELSEPRINT@417,"THAT WON'T WO
RK":PLAY"L4AB":PRINT@353," ":PRI
NT:PRINT:GOTO2410
2490 PLAY"L2CL1O5BBBL4O2C":CLS:P
RINT:PRINT"THE LIZARD SCREAMS CA
USING A    STONE TO FALL FROM TH
E CEILING    - YOU ARE CRUSHED BE
NEATH IT.":PLAY"L1ABGFE":CLS:GOT
O2260
3100 GOSUB50500
3102 GOSUB50900
3104 GOSUB50400
3110 IF BB=0THENPRINT@290,"BROAD
SWORD"ELSEPRINT@290,NS$
3115 GOSUB60000
3120 IF Z$="N"THENGOTO4100ELSEIF
 Z$="S"THENGOTO2100
3130 IF Z$="T"ANDBB=0THENGOTO314
0ELSEPRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO3110
3140 PRINT@353,"TAKE":PRINT@385,
"what";:GOSUB60010
```

```
3150 IF Z$="B"THENGOTO3160ELSEPR
INT@385,YC$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO3110
3160 PRINT@385,"BROADSWORD":PRIN
T@417,"BROADSWORD TAKEN":BB=1:PL
AY"CCC":PRINT@353," ":PRINT:PRIN
T:GOTO3102
3200 GOSUB50100
3202 GOSUB60200
3204 GOSUB50300
3206 GOSUB50900
3210 IF JJ=0THENPRINT@290,"JEWEL
"ELSEPRINT@290,NS$
3215 GOSUB60000
3220 IF Z$="E"THENGOTO3300ELSEIF
 Z$="S"THENGOTO2200
3230 IF Z$="T"ANDJJ=0THENGOTO324
0ELSEPRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO3215
3240 PRINT@353,"TAKE":PRINT@385,
"what";:GOSUB60010
3250 IF Z$="J"THENGOTO3260ELSEPR
INT@385,"YOU CAN'T TAKE THAT":PL
AY"L4AB":PRINT@352," ":PRINT:GOT
O3215
3260 PRINT@385,"JEWEL":PRINT@417
,"JEWEL TAKEN":PLAY"CDA":JJ=1:PR
INT@353," ":PRINT:PRINT:GOTO3206
3300 GOSUB50500
3302 GOSUB50600
3304 GOSUB50700
3306 GOSUB50800
3308 GOSUB50900
3310 IF JJ=1ANDAA=0THENPRINT@290
,"ANGRY WIZARD":GOTO3340ELSEPRIN
T@290,NS$
3315 GOSUB60000
3320 IF Z$="N"THENGOTO4300ELSEIF
 Z$="S"THENGOTO2300ELSEIF Z$="E"
THENGOTO3400ELSEIF Z$="W"THENGOT
O3200
3330 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO3315
3340 GOSUB60000
3350 IF Z$="K"THENGOTO3370ELSEIF
 Z$="C"THENGOTO3360
3355 PRINT@353,"THE WIZARD SAYS
'OLAN COLAIN'  YOU FIND YOURSELF
 THE SIZE OF A FLY AND TRAPPED I
N THE WEB OF A VERY HUNGRY SPIDE
R.":PLAY"L1O3AO4AO1AO2A":CLS:GOT
O2260
3360 IF MM<>1THENPRINT@353,"YOU
HAVE NOTHING TO CAST":PLAY"L4AB"
:PRINT@353," ":GOTO3340ELSEPRINT
@353,"CAST":PRINT@385,"what";:GO
SUB60010
3365 IF Z$="M"THENPRINT@385,"MAG
IC SPELL":MM=-1:PRINT@417,"THE W
```

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```
IZARD IS IMMOBILIZED":PLAY"L2CDE
":PRINT@353," ":PRINT:PRINT:PRIN
T@241,"               ";:GOTO3340
3367 PRINT@385,"YOU CAN'T CAST T
HAT":PLAY"L4AB":PRINT@353," ":PR
INT:GOTO3340
3370 PRINT@353,"KILL":PRINT@385,
"what";:GOSUB60010
3375 IF Z$="A"THENGOTO3380ELSEPR
INT@385,YK$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO3340
3380 PRINT@385,"ANGRY WIZARD":PR
INT@417,"WITH what";:GOSUB60010
3385 IF Z$="B"ANDMM=-1THENGOTO33
90ELSEPRINT@353,"BEFORE YOUR WEA
PON FINDS ITS   MARK, BOLTS OF E
NERGY FROM THE  WIZARD'S FINGERS
 TURN YOU AND   ALL YOUR POSSESS
IONS INTO ASH.":PLAY"L1O1BO2BO3B
O2B":CLS:GOTO2260
3390 PRINT@422,"BROADSWORD":AA=1
:PRINT@439,"WIZARD  VANISHES AS
 BLADE STRIKES HIM.":PLAY"L2O5EO
1EO4EO3EO2E":PRINT@353," ":PRINT
:PRINT:PRINT:GOTO3308
3400 GOSUB50700
3402 GOSUB50900
3404 GOSUB50400
3410 PRINT@290,NS$:GOSUB60000
3420 IF Z$="N"THENGOTO4400ELSEIF
 Z$="S"THENGOTO2400ELSEIF Z$="W"
THENGOTO3300
3430 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO3410
4100 GOSUB50100
4102 GOSUB50900
4110 IF OO=0THENPRINT@290,"ORANG
E SPHERE"ELSEPRINT@290,NS$
4115 GOSUB60000
4120 IF Z$="S"THENGOTO3100ELSEIF
 Z$="T"ANDOO=0THENGOTO4140
4130 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO4115
4140 PRINT@353,"TAKE":PRINT@385,
"what":GOSUB60010
4150 IF Z$="O"THENGOTO4160ELSEPR
INT@385,YC$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO4115
4160 PRINT@385,"ORANGE SPHERE":P
RINT@417,"ORANGE SPHERE TAKEN":P
LAY"L2DCD":OO=1:PRINT@353," ":PR
INT:PRINT:GOTO4102
4200 GOSUB50400
4202 GOSUB50200
4204 GOSUB50700
4206 GOSUB50900
4210 PRINT@290,"STAIRS LEADING D
OWN":GOSUB60000
4220 IF Z$="W"THENGOTO4225ELSEPR
```

```
INT@353,IM$:PLAY"L4AB":PRINT@353
," ":GOTO4210
4225 GOSUB50800
4230 PRINT@290,"A SMALL OPENING
AND STAIRS":GOSUB60000
4235 IF Z$="E"THENGOTO4200ELSEIF
 Z$="W"ANDGG=1THENGOTO4245ELSEIF
 Z$="W"THENGOTO4250
4240 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO4230
4245 CLS:PRINT"  AS YOU COME THR
OUGH THE OPEN- ING DOGHEDRA'S GU
ARDS SEIZE YOU AND STRIP YOU OF
ALL POSSESSIONSYOU ARE BROUGHT B
EFORE DOGHEDRA.BEHIND HIM THE SU
N IS BISECTED  BY THE HORIZON."
4246 PRINT"  DOGHEDRA SPEAKS 'YO
U HAVE       RETURNED WITH THE TRE
ASURE FROM THE MAZE OF MOYCULLEN
.  YOU ARE A GRAND WARRIOR."
4247 PRINT"  AS I PROMISED, YOU
AND YOUR     FAMILY MAY GO FREE.
FURTHER,     NO LONGER WILL WE INV
ADE YOUR     LANDS, YOU AND YOUR P
EOPLE MAY    LIVE IN PEACE.'"
4248 PLAY"O2L4GO3CCL8DCL4O2AGGO3
CCDL2.EL4DDDEGAGEL2.GO2L4AL16AB
O3CO2BL4AGEGO3CO2BL2AL4GCEGL8AGL
2EL8.CL16EL4DCCL2C"
4249 FOR Q=1TO2000:NEXTQ:CLS:GOT
O2260
4250 CLS:PRINT"  AS YOU COME THR
OUGH THE OPEN- ING, DOGHEDRA'S G
UARDS SEIZE YOUAND STRIP YOU OF
ALL POSSESSIONSYOU ARE BROUGHT B
EFORE DOGHEDRA.BEHIND HIM THE SU
N IS BISECTED  BY THE HORIZON."
4251 PRINT"  DOGHEDRA SPEAKS 'YO
U HAVE       RETURNED FROM THE MAZ
E OF         MOYCULLEN ALIVE. YOU
ARE A GREATWARRIOR.  HOWEVER,YOU
 FAILED TO RETURN WITH THE GOLDE
N TREASURE AS YOU WERE CHARGED.
 YOU AND    YOUR FAMILY WILL BE E
XECUTED."
4252 PRINT"  AS A GREAT WARRIOR
IT IS YOUR HONOR TO DIE FIRST SO
 AS NOT TO SEE YOUR LOVED ONES S
UFFER.'";
4253 FOR X=1TO1000:NEXTX
4260 FOR X=1TO25:PLAY"O1V20L4BL8
V10BBB":NEXTX
4275 CLS:PRINT:PRINT"  YOU ARE S
TRAPPED TO THE        SACRIFICIAL
 STONE. A LARGE       SWORD IS RA
ISED ABOVE YOUR       HEAD AND...
"
4280 FOR X=1TO10:PLAY"O1V20L4BL8
V10BBB":NEXTX
```

```
4285 CLS(0):FOR X=1TO1000:NEXTX
4290 GOTO2260
4300 GOSUB50700
4302 GOSUB50400
4304 GOSUB50300
4306 GOSUB50900
4308 GOSUB50500
4310 IF MM=0THENPRINT@290,"MAGIC
 SPELL"ELSEPRINT@290,NS$
4320 GOSUB60000
4330 IF Z$="N"THENGOTO5300ELSEIF
 Z$="S"THENGOTO3300
4340 IF Z$="T"ANDMM=0THENGOTO435
0ELSEPRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO4320
4350 PRINT@353,"TAKE":PRINT@385,
"what";:GOSUB60010
4360 IF Z$="M"THENGOTO4370ELSEPR
INT@385,YC$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO4320
4370 PRINT@385,"MAGIC SPELL":PRI
NT@417,"MAGIC SPELL TAKEN":PLAY"
L2O3CO2C":MM=1:PRINT@353," ":PRI
NT:PRINT:GOTO4306
4400 GOSUB50700
4402 GOSUB50300
4404 GOSUB50900
4410 PRINT@290,"COBWEBS":GOSUB60
000
4420 IF Z$="N"THENGOTO5400ELSEIF
 Z$="S"THENGOTO3400
4430 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO4410
5100 GOSUB50300
5102 GOSUB50900
5110 IF GG=0THENPRINT@290,"GOLD
COINS"ELSEPRINT@290,NS$
5120 GOSUB60000
5130 IF Z$="E"THENGOTO5200ELSEIF
 Z$="T"ANDGG=0THENGOTO5150
5140 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO5120
5150 PRINT@353,"TAKE":PRINT@385,
"what";:GOSUB60010
5160 IF Z$="G"THENGOTO5170ELSEPR
INT@385,YC$:PLAY"L4AB":PRINT@353
," ":PRINT:GOTO5120
5170 PRINT@385,"GOLD COINS":PRIN
T@417,"GOLD COINS TAKEN":PLAY"L3
CO3L2CO4L1C":PRINT@353," ":PRINT
:PRINT:GG=1:GOTO5102
5200 GOSUB50200
5202 GOSUB50800
5204 GOSUB60300
5206 GOSUB50900
5210 PRINT@290,"IDOL ON SOUTH WA
```

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```
LL":GOSUB60000
5220 IF Z$="E"THENGOTO5300ELSEIF
 Z$="W"THENGOTO5240ELSEIF Z$="P"
THENGOTO5250
5225 IF Z$="T"THENPRINT@353,"IDO
L IS ATTACHED TO THE WALL";:PLAY
"L4AB":PRINT@353," ":GOTO5210
5230 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO5210
5240 GOSUB50700
5245 PRINT@353,"THE WALL SWINGS
AWAY AT YOUR    TOUCH TO REVEAL
A HIDDEN ROOM":PLAY"L2O1BEG":PRI
NT@353," ":PRINT:GOTO5100
5250 PRINT@353,"PUT":PRINT@385,"
what";:GOSUB60010
5260 IF Z$="J"ANDJJ=1THENGOTO528
5ELSEIF Z$="O"ANDOO=1THENGOTO527
0ELSEPRINT@385,"YOU CAN'T PUT TH
AT ANYWHERE":PLAY"L4AB":PRINT@35
3," ":PRINT:GOTO5210
5270 PRINT@385,"ORANGE SPHERE":P
RINT@417,"IN what";:GOSUB60010
5275 IF Z$="I"THEN PRINT@420,"ID
OL":PRINT@448,"SHARPENED STONES
FLY FROM IDOL'SMOUTH PIERCING YO
UR HEART";:PLAY"L10O4ABAL2O1BAG"
:CLS:GOTO2260ELSE GOTO5280
5280 PRINT@417,"YOU CAN'T PUT AN
YTHING THERE":PLAY"L4AB":PRINT@3
53," ":PRINT:PRINT:GOTO5210
5285 PRINT@385,"JEWEL":PRINT@417
,"IN what";:GOSUB60010
5290 IF Z$<>"I"THENGOTO5280ELSEP
RINT@420,"IDOL":JJ=-1:GOSUB50600
:PRINT@449,"A HIDDEN ROOM APPEAR
S";:PLAY"L1O3AO2BO1AO2B":PRINT@3
53," ":PRINT:PRINT:PRINT:GOSUB60
000
5295 IF Z$="S"THENGOTO4200ELSEPR
INT@353,"THE WALL SWINGS BACK QU
ICKLY":PLAY"O1C":PRINT@384,"AS I
T SLAMS SHUT THE IDOL BREAKSLOOS
E AND TOPPLES UPON YOU.  YOUARE
PINNED BENEATH IT.  MY GUESS IS
YOU WILL STARVE TO DEATH.";
5297 PLAY"O4L1AO5L5AO2L1BGEC":CL
S:GOTO2260
5300 GOSUB50100
5302 GOSUB50400
5304 GOSUB50600
5306 GOSUB50900
5308 GOSUB50700
5310 PRINT@290,NS$:GOSUB60000
5320 IF Z$="W"THENGOTO5200ELSEIF
 Z$="S"THENGOTO4300
5330 PRINT@353,IM$:PLAY"L4AB":PR
INT@353," ":GOTO5310
5400 GOSUB50100
5402 GOSUB50900
5410 PRINT@290,"FUNNY HOLES IN W
ALLS":PLAY"L4AB"
5420 PRINT@352,"YOUR FOOT STRIKE
S A STONE THAT  SINKS SLIGHTLY.
 INSTANTLY,     POISON-TIPPED AR
ROWS SHOOT FROM THE WALLS.  YOU
ARE DEAD.":PLAY"L1O1AAO2CO1AAO2C
":CLS:GOTO2260
50000 F$=CHR$(128):FOR Y=32 TO 1
92 STEP 32
50010 FOR X=2 TO 12:PRINT@(Y+X),
F$;:NEXTX:NEXTY:RETURN
50100 FOR X=34 TO 44:PRINT@X,W$;
:NEXTX:RETURN
50200 FOR X=194 TO 204:PRINT@X,W
$;:NEXTX:RETURN
50300 FOR X=34 TO 194 STEP 32:PR
INT@X,W$;:NEXTX:RETURN
50400 FOR X=44 TO 204 STEP 32:PR
INT@X,W$;:NEXTX:RETURN
50500 FOR X=35 TO 43:PRINT@X,F$;
:NEXTX:RETURN
50600 FOR X=195 TO 203:PRINT@X,F
$;:NEXTX:RETURN
50700 FOR X=66 TO 162 STEP 32:PR
INT@X,F$;:NEXTX:RETURN
50800 FOR X=76 TO 172 STEP 32:PR
INT@X,F$;:NEXTX:RETURN
50900 IF GG=1 THEN PRINT@145,"GO
LD";
50910 IF BB=1 THEN PRINT@177,"BR
OADSWORD";
50920 IF JJ=1 THEN PRINT@152,"JE
WEL";
50930 IF OO=1 THEN PRINT@273,"OR
ANGE SPHERE";
50940 IF MM=1 THEN PRINT@241,"MA
GIC SPELL";
50950 IF FF=1 THEN PRINT@209,"FL
AMING TORCH";
50960 PRINT@17,"NORTH  SOUTH";:P
RINT@49,"EAST   WEST";:PRINT@81,
"TAKE  PUT";:PRINT@113,"KILL
CAST";:RETURN
60000 PRINT@352,"*";
60010 Z$=INKEY$
60020 IF Z$="" THEN GOTO 60010
60030 RETURN
60100 FOR X=34 TO 44:PRINT@X,P$;
:NEXTX:RETURN
60200 FORX=194 TO 204:PRINT@X,P$
;:NEXTX:RETURN
60300 FOR X=34 TO 194 STEP 32:PR
INT@X,P$;:NEXTX:RETURN
60400 FOR X=44 TO 204 STEP 32:PR
INT@X,P$;:NEXTX:RETURN
```

16K
ECB

This IRA/Keogh Plan estimator allows for payroll deductions

Loop Until Done

By Bruce W. Ronald

I don't like it when the computer solves a complex problem a split second after I press ENTER. This program is quite the reverse. It could chug away for 20 minutes calculating a 30-year projection using daily compounding and weekly contributions.

This program almost didn't see the light of print. I had written it because I couldn't find any such program, and almost immediately after submission the August 1984 RAINBOW arrived with Leonard Hyre's very fine, fast and accurate IRA estimator.

I was surprised when RAINBOW said it wanted to publish my much slower estimator. At first I thought maybe they didn't like blindingly fast programs either, but on reflection I discovered my program does do a few things Mr. Hyre's does not. It error traps excess contributions — anything over $2,000 annually for wage earner IRAs and $2,250 for spousal IRAs. (If this amount is increased, as planned, you will need to edit program lines 440, 450 and 730.) It allows for contributions made the way many of us make them, via payroll deduction. This program allows annual, monthly, twice monthly, biweekly and weekly contributions.

This is what I would call a boilerplate program. If something didn't work, I'd add another line or another `GOSUB` routine. Here's an example, which I added after the original submission, that speeds the program up dramatically for those persons who contribute annually or monthly and have their interest compounded quarterly or monthly.

Look at Line 825. It instructs the computer that those with quantity compounding and annual contributions skip both the monthly and daily loops required for the twice monthly, biweekly and weekly contribution routines. Line 835, within the monthly loop, allows for monthly contributions while avoiding the time-consuming daily loop. Lines 985 and 995 do the same within the monthly compounding loop. This results in a considerable speedup, from about 28 seconds per year to three seconds or less.

But for daily compounding and/or twice monthly, biweekly or weekly contributions, the daily loops are required, forcing the computer to loop 360 times each year.

Quick Notes

If you do not have a printer, you may eliminate lines 520, 550 and 590, and all lines that begin `PRINT#-2`. To eliminate the introduction (just read it in the listing), don't type in Line 20 and the subroutine between 1490 and 1690.

Lines 1510 and 1520, for example, illustrate an interesting anti-ugly technique that Dave Barr, president of one of Dayton's two Color Computer clubs, showed me. Type your line number and print, then advance the cursor to the last space on the line and enter your quotation mark. This forces the text to appear as you will see it on the screen. It avoids unsightly gaps and lets you hyphenate words, if needed. This technique, although it obviously chews up

---

Bruce Ronald, an advertising copywriter, holds a bachelor's degree in speech. He has written a science fiction thriller, Our Man in Space, *and the book of the musical,* Dracula, Baby. *He and his wife, Virginia, coauthored two prize-winning local histories of Dayton and its suburb, Oakwood — the latter on the CoCo.*

memory, is ideal for programs with a lot of text, such as an Adventure game.

Why no high-speed poke? My computer can handle it and it does speed up execution, but not so much as I would expect. If you wish to add it, put it in the three daily loop routines at 840, 1000 and 1160 as `POKE 65495,0:FOR Z=1 TO 30`. But if you are using a printer, you must `POKE 65494,0` before each of the three printer `GOSUB`s. It should run on a 16K machine if you `PCLEAR 1` before loading.

There is a slight cheat in the last line of the program — it adjusts biweekly and weekly contributions from 24 to 26 and 48 to 52 respectively.

Now make your CoCo work to show you how rich you'll be someday! ☐

(Mr. Ronald can be reached at 101 Forrer Blvd., Dayton, OH 45419, phone 513-294-8808. Please include an SASE when writing.) ☐

IRA/KEOGH Estimator

```
THIS PLAN RUNS FROM 1986 TO 2026
INTEREST ASSUMED IS  11.5 %  COMPOUNDED DAILY WITH CONTRIBUTIONS OF $ 2000 ANNU
 1986             Contribution:****$2,000.00  YEAR-END TOTAL:****$2,243.71
 1987             Contribution:****$2,000.00  YEAR-END TOTAL:****$4,760.81
 1988             Contribution:****$2,000.00  YEAR-END TOTAL:****$7,584.64
 1989             Contribution:****$2,000.00  YEAR-END TOTAL:***$10,752.55
 1990             Contribution:****$2,000.00  YEAR-END TOTAL:***$14,306.49
 1991             Contribution:****$2,000.00  YEAR-END TOTAL:***$18,293.48
 1992             Contribution:****$2,000.00  YEAR-END TOTAL:***$22,766.30
 1993             Contribution:****$2,000.00  YEAR-END TOTAL:***$27,784.14
 1994             Contribution:****$2,000.00  YEAR-END TOTAL:***$33,413.42
 1995             Contribution:****$2,000.00  YEAR-END TOTAL:***$39,728.65
 1996             Contribution:****$2,000.00  YEAR-END TOTAL:***$46,813.40
 1997             Contribution:****$2,000.00  YEAR-END TOTAL:***$54,761.45
 1998             Contribution:****$2,000.00  YEAR-END TOTAL:***$63,678.00
 1999             Contribution:****$2,000.00  YEAR-END TOTAL:***$73,681.05
 2000             Contribution:****$2,000.00  YEAR-END TOTAL:***$84,903.00
 2001             Contribution:****$2,000.00  YEAR-END TOTAL:***$97,492.38
 2002             Contribution:****$2,000.00  YEAR-END TOTAL:**$111,615.80
 2003             Contribution:****$2,000.00  YEAR-END TOTAL:**$127,460.21
 2004             Contribution:****$2,000.00  YEAR-END TOTAL:**$145,235.30
 2005             Contribution:****$2,000.00  YEAR-END TOTAL:**$165,176.34
 2006             Contribution:****$2,000.00  YEAR-END TOTAL:**$187,547.26
 2007             Contribution:****$2,000.00  YEAR-END TOTAL:**$212,644.13
 2008             Contribution:****$2,000.00  YEAR-END TOTAL:**$240,799.12
 2009             Contribution:****$2,000.00  YEAR-END TOTAL:**$272,384.88
 2010             Contribution:****$2,000.00  YEAR-END TOTAL:**$307,819.46
 2011             Contribution:****$2,000.00  YEAR-END TOTAL:**$347,571.84
 2012             Contribution:****$2,000.00  YEAR-END TOTAL:**$392,168.16
 2013             Contribution:****$2,000.00  YEAR-END TOTAL:**$442,198.67
 2014             Contribution:****$2,000.00  YEAR-END TOTAL:**$498,325.54
 2015             Contribution:****$2,000.00  YEAR-END TOTAL:**$561,291.63
 2016             Contribution:****$2,000.00  YEAR-END TOTAL:**$631,930.30
 2017             Contribution:****$2,000.00  YEAR-END TOTAL:**$711,176.51
 2018             Contribution:****$2,000.00  YEAR-END TOTAL:**$800,079.09
 2019             Contribution:****$2,000.00  YEAR-END TOTAL:**$899,814.70
 2020             Contribution:****$2,000.00  YEAR-END TOTAL:$1,011,703.38
 2021             Contribution:****$2,000.00  YEAR-END TOTAL:$1,137,226.01
 2022             Contribution:****$2,000.00  YEAR-END TOTAL:$1,278,043.92
 2023             Contribution:****$2,000.00  YEAR-END TOTAL:$1,436,020.91
 2024             Contribution:****$2,000.00  YEAR-END TOTAL:$1,613,247.84
 2025             Contribution:****$2,000.00  YEAR-END TOTAL:$1,812,070.37
 2026             Contribution:****$2,000.00  YEAR-END TOTAL:$2,035,119.98
    TOTAL CONTRIBUTIONS:***$82,000.00 INTEREST EARNED:$1,953,119.98
FOR A MAN AT 65 THIS WOULD RESULT IN MONTHLY PAYMENTS OF $**$25,852.64
```

150	49	1050	196
340	88	1340	3
490	86	1500	10
680	78	1600	153
790	84	END	103

The listing: `IRAKEOGH`

```
1 REM SCARCELY ELEGANT BUT IT
  WORKS.
2 REM BY BRUCE W RONALD
3 REM     101 FORRER BLVD
4 REM     DAYTON,OHIO 45419
5 REM ***********************
10 CLEAR 500
20 GOSUB 1490
30 CLS
40 PRINT"          IRA/KEOGH ESTIMA
TOR"
50 PRINT:PRINT
60 PRINT"THIS PROGRAM WILL SHOW
YOU HOW"
70 PRINT"FUNDS INVESTED IN AN IR
A OR"
80 PRINT"KEOGH CAN ACCRUE TO SIG
NIFICANT"
90 PRINT"SUMS OVER THE YEARS."
100 FOR Q=1 TO 1800: NEXT Q:CLS
110 PRINT:PRINT:
120 PRINT "YOU NEED TO INPUT SOM
E DATA:"
130 INPUT"YEAR YOU STARTED (OR W
ILL START) YOUR PLAN";S1
140 INPUT"YEAR YOU WILL FINISH Y
OUR PLAN";S2
150 Y=S2-S1+1
160 PRINT"ANSWER THE NEXT QUESTI
ON WITH A DECIMAL AMOUNT. EXAMPL
E: ENTER  11 1/2% AS .115"
170 INPUT"ANTICIPATED ANNUAL RAT
E OF INTEREST";I
180 IF I>1 THEN PRINT "DECIMAL V
ALUE, PLEASE.":GOTO 170
190 INPUT"TO BE COMPOUNDED? Quar
tery/Monthly/Daily";C$
200 IF C$="Q" THEN C1$="QUARTERL
Y"
210 IF C$="M" THEN C1$="MONTHLY"
220 IF C$="D" THEN C1$="DAILY"
230 PRINT "CONTRIBUTIONS TO BE M
ADE--"
240 PRINT"
 Annually?"
250 PRINT"
  Monthly?"
260 PRINT"                     Twic
e a month?"
270 PRINT"
Bi-weekly?"
```

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SUPER 'COMBINATION' SPECIALS!

WORD PROCESSING

Telewriter 64	(D) $ 52.00	(Save-13%)
TW 64+Dynacalc	(D) $104.50	(Save-25%)
TW 64+Pro-Color-File 2.0 enhanced	(D) $ 89.50	(Save-25%)
TW 64+Pro-Color-File+Dynacalc	(D) $143.00	(Save-28%)
Telepatch	(D) $ 17.95	(Save-10%)
TW 64+Telepatch	(D) $ 59.50	(Save-25%)
TW 64+Telepatch+Dynacalc	(D) $119.75	(Save-25%)
TW 64+Telepatch+Pro-Color-File	(D) $100.00	(Save-28%)
Telegraphics	(D) $ 22.00	(Save-11%)
Telegraphics+CoCo Max II	(D) $ 92.00	)Save-12%)
TW 64+Telegraphics	(D) $ 63.00	(Save-25%)
TW 64+Telegraphics+Telepatch	(D) $ 78.50	(Save-25%)
Master Design	(D) $ 26.75	(Save-11%)
Master Design+CoCo Max II)	(D) $ 96.50	(Save-12%)
TW 64+Master Design	(D) $ 67.25	(Save-25%)
TW 64+Master Design+Telepatch	(D) $ 82.25	(Save-25%)
Font Generator	(D) $ 26.95	(Save-10%)
TW 64+Font Generator	(D) $ 67.40	(Save-25%)
TW 64+Font Generator+Telepatch	(D) $ 82.35	(Save-25%)
TW 64+Font+patch+Telegraphics	(D) $101.10	(Save-25%)
TW 64+Font+patch+ Mast. Desg.	(D) $104.85	(Save-25%)

DATABASE MANAGEMENT

Pro-Color-File 2.0 enhanced	(D) $ 53.95	(Save-10%)
TW 64+Pro-Color-File 2.0 enhanced	(D) $ 89.50	(Save-10%)
TW 64+Pro-Color-File + Dynacalc	(D) $143.00	(Save-28%)
TW 64+Pro-Color-File + Telepatch	(D) $100.00	(Save-28%)
TW 64+P-C-F + patch + graphics	(D) $118.00	(Save-28%)
TW 64+P-C-F + patch + M. Design	(D) $122.25	(Save-28%)
Pro-Color-Forms 2.0	(D) $ 26.95	(Save-10%)
Pro-Color-File + Pro-Color-Forms	(D) $ 76.40	(Save-15%)
Pro-Color-File+P-C-Forms+TW 64	(D) $112.25	(Save-25%)
PC-File+PC-Forms+TW 64+patch	(D) $127.25	(Save-25%)
PC-File+PC-Forms+TW 64+calc	(D) $165.45	(Save-28%)
File+Forms+TW 64+patch+calc	(D) $177.00	(Save-29%)
E-Z Base	(D) $ 22.45	(Save-10%)

SPREADSHEET

Dynacalc	(D) $ 71.95	(Save-10%)
Dynacalc + Dynagraph	(D) $ 87.90	(Save-12%)
Dynacalc + Sidewise	(D) $ 92.30	(Save-12%)
Dynacalc + Dynagraph + Sidewise	(D) $108.60	(Save-13%)
TW 64 + Dynacalc	(D) $104.50	(Save-25%)
TW 64 + Dynacalc + Dynagraph	(D) $119.75	(Save-25%)
TW 64 + Dynacalc + Sidewise	(D) $123.60	(Save-25%)
TW 64+Dynacalc+graph+patch	(D) $134.85	(Save-25%)
TW 64+Dynacalc+Sidewise+patch	(D) $138.60	(Save-25%)
TW 64+calc+graph+wise+patch	(D) $151.50	(Save-26%)
TW 64 + Dynacalc + Pro-Color-File	(D) $143.00	(Save-28%)
TW 64+Dynacalc+P-C-File+ patch	(D) $158.25	(Save-28%)
TW 64+calc+File+patch+graph	(D) $172.50	(Save-28%)
Dynagraph	(D) $ 17.95	(Save-10%)
Dynagraph + Sidewise	(D) $ 39.95	(Save-11%)
Sidewise	(D) $ 22.20	(Save-11%)

COMMUNICATIONS

Colorcom/E	(D) $ 42.45	(Save-15%)
Colorcom/E + Colorama BBS	(D) $119.90	(Save-20%)
C-Com/E+BBS+Time Module for BBS	(D) $167.85	(Save-20%)
Colorcom/E + TW 64	(D) $ 76.90	(Save-30%)
Colorcom/E + TW 64 + Telepatch	(D) $ 90.00	(Save-30%)
C-com/E+TW 64 + patch + P-C-File	(D) $132.85	(Save-30%)
C-com/E+TW 64 + patch+Dynacalc	(D) $146.85	(Save-30%)
com/E + TW 64 + patch + File + calc	(D) $188.80	(Save-30%)
Colorama BBS	(D) $ 89.95	(Save-10%)
Colorama BBS+Time Module for BBS	(D) $135.90	(Save-15%)
Time Module for Colorama BBS	(D) $ 53.95	(Save-10%)

GRAPHICS

CoCo Max II (Requires 'Y' Cable)	(D) $ 71.95	(Save-10%)
CoCo Max II upgrade for Max I owners	(D) $ 18.00	(Save-10%)
Max Edit (Font Generator-Max I & II	(D) $ 17.95	(Save-10%)
TW 64+PC-File+Dynacalc+Max II	(D) $209.85	(Save-25%)
TW 64+Telegraphics + CoCo Max II	(D) $123.50	(Save-25%)
TW 64+Telegraphics + patch + Max	(D) $133.00	(Save-28%)
TW 64+Master Design + CoCo Max II	(D) $127.25	(Save-25%)
TW 64+Master Design + patch + Max	(D) $136.65	(Save-28%)
TW 64+graph + patch + max + EDIT	(D) $147.40	(Save-28%)
TW 64+Design + patch + max + EDIT	(D) $151.00	(Save-28%)

All orders add $3.00 shipping & handling, Ky. residents add 5%
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**	Colorcom/E + any one of the following	SAVE 15%!
**	Colorcom/E + any two of the following	SAVE 18%!
***	Telewriter 64 + any one of the following	SAVE 20%!
***	Telewriter 64 + any two of the following	SAVE 25%!

These discounts pertain to only 'MAJOR SYSTEMS UTILITIES' and software listed in 'MUSIC AND SPEECH SYSTEMS' sections.

MAJOR SYSTEMS UTILITIES

CoCo Checker (Complete system diagnostic)	(D) $ 19.00
Tape/Disk Utility	(D) $ 24.00
Disk Utility 2.1 A	(D) $ 24.00
OS-9 Solution (Disk Utility 2.1 for OS-9	(D) $ 39.00
OS-9 Thunder RAM - RAM Disk	(D) $ 24.00
Spit-N-Image 3.2	(D) $ 29.00
CoCo Util (MS DOS - CoCo file transfer	(D) $ 29.00
Disk Sort & Order (JDOS or RS DOS - SS or DS)	(D) $ 20.00
(Convert RSDOS Disk to JDOS Disk Unsectored Data on Disk!) (Save 25 30 percent of physical life of your disk drives!!)	
Valet	(D-T) $ 21.00
(A totally unique approach to household based filing systems.) (Soon to be reviewed in Rainbow Valet = "personal servant".) (If you order any other program & mention that you would like) (to order valet also you will get a $10.00 added discount!!)	
CGP-115 Printer/Plotter Screen Dump	(D-T) $ 21.00
Gemini-Epson Screen Dump	(D-T) $ 19.00
DMP-100 & Compatibles Screen Dump	(D-T) $ 19.00
The CoCo Greeting Card Designer	(D) $ 24.00
Schematic Drafting Processor	(D) $ 29.00

MUSIC & SPEECH SYSTEMS

Ears . . . . (Requires 'Y' Cable)	(D) $ 97.50
Super Voice . . . . (Requires 'Y' Cable	(D) $ 75.00
Radio Shack Speech & Sound Translator	(D) $ 23.50
Symphony . . . . (Requires 'Y' Cable)	(D) $ 78.50
Stereo Pak . . . . (Requires 'Y' Cable)	(R) $ 38.50
Synther 77 Plus	(D) $ 28.50
CoCo MIDI	(T-D) $ 38.50
Piano Keyboard (2 1/2 Octabe - 32 Notes)	$ 80.00
Piano Keyboard (4 Octave - 49 Notes)	$120.00
Musica 2	(T-D) $ 28.00
Music Theory	((D) $ 48.00
Music Library (100 or 200 or 300 or 400 or 500)	(T-D) $ 29.00
Music Library (All Five Libraries)	(T-D) $100.00
Super Voice Songbook (Vol. 1 or Vol. 2)	(D) $ 19.00
Super Voice Songbook (Both Volumes)	(D) $ 37.00
Termtalk	(T) $ 38.50 - (D) $ 48.50

DISKETTES & TAPES

5 1/4" Diskettes	75 cents each
(Tyvec envelopes Hub rings WP tabs Lifetime guarantee)	
C-6 Cassette Tapes	50 cents each

CABLES - SWITCHES & MORE

40 Pin (Dual) 'Y' Cable	$ 29.50
40 Pin (Triple) 'Y' Cable	$ 36.00
RS-232c 2-Position Switch	$ 29.00
RS-232c 3-Position Switch	$ 39.00
DOS Switcher (Jumper select any 24-28 Pin Combination)	$ 35.00
Universal Video Driver (Mono or Color Monitors)	$ 29.00

CHIPS - UPGRADES & EPROM PROGRAMER

64K Upgrade (Set of 8 - 4164s - 150ns)	$ 16.00
64K Upgrade (Set of 2 - 4464s - 'A' Models only)	$ 39.00
6809E CPU Chip	$ 15.00
Intronics EPROM Programer	$139.00
27128 (28 Pin - 16K - EPROM)	$ 5.00
27128 ('Burned' with your program - Guaranteed work)	$ 25.00
Any EPROM burned with your program - you supply chip	$ 20.00

DISK CONTROLLERS

DISTO Supercontroller		$ 99.75
(Includes CDOS + 3.28 Pin sockets and Extra Parallel Port)		
Parallel Printer Adapter	$19.75	
Real Time Clock	$39.75	
Display 80 (80 column - Clock - Printer Adapter)	$99.75	
MPROM Programer (EPROM programer)	$59.75	
JFD-CP (JDOS + 24 Pin socket and Parallel Port)		$135.00

DISK DRIVES

TEAC 54A (40 Track-Gold Edge Connectors-SS/DD-Bare)	$125.00
TEAC 55B (40 Track-Gold Edge Connectors-DS/DD-Bare)	$135.00

PRINTER & PRINTER INTERFACE

GEMINI SG-10	$249.00
120 cps True descenders 2K Buffer Tractor and Friction Feeds. Roll, fan fold and single page. One full year warranty and "Near Letter Quality" mode. Full dot addressable graphics!	
PBH 'BRITE FACE' Parallel Printer Interface	$ 59.00
First 'intelligent' serial to parallel interface! Auto set 600 to 9600 baud rates - without turning any switches!	
SG-10 Printer and Briteface Interface Together	$300.00
(Gemini Epson Screen Dump is FREE with this purchase!)	

(D) = DISK (T) = TAPE (D-T) = DISK OR TAPE (R) = ROMPAK

3825 Bardstown Road. Suite 232 Louisville. KY 40218
(502) 454-6809

```
280 PRINT"
  Weekly?"
290 PRINT
300 INPUT"ENTER FIRST LETTER OF
YOUR      CHOICE";D$
310 IF D$="A" THEN Z$="ANNUALLY"
320 IF D$="A" THEN M=1
330 IF D$="M" THEN Z$="MONTHLY
340 IF D$="M" THEN M=12
350 IF D$="T" THEN Z$="TWICE MON
THLY"
360 IF D$="T" THEN M=24
370 IF D$="B" THEN Z$="BI-MONTHL
Y"
380 IF D$="B" THEN M=26
390 IF D$="W" THEN Z$="WEEKLY"
400 IF D$="W" THEN M=52
410 INPUT"HOW MUCH PER PAYMENT";
C
420 INPUT"TYPE OF IRA:Wage earne
r/Spousal";T$
430 IF T$="W" GOTO 440 ELSE 450
440 IF (C*M)>2000 AND T$="W" THE
N T4=2000:GOSUB 720
450 IF (C*M)>2250 AND T$="S" THE
N T4=2250:GOSUB 720
460 INPUT"AMOUNT,IF ANY, AT STAR
T OF YEAR";A
470 PRINT"NOTE. IF YOU ARE CONTR
IBUTING ONAN ANNUAL BASIS, THIS
PROGRAM   ASSUMES THE CONTRIBUTI
ON IS MADE"
480 PRINT "AT THE START OF THE Y
EAR. IF     THIS IS NOT THE CASE,
 YOU SHOULD START ONE YEAR LATER
."
490 PRINT"IF ANY DATA IS INCORRE
CT, PRESS break AND TYPE run TO
GET CORRECT DATA INTO THE PROGRA
M.
500 T=A:PRINT:PRINT
510 TC=M*(C*Y):E=M*C
520 INPUT"OUTPUT TO Screen OR Pr
inter";O$
530 CLS:PRINT"THIS COMPOUNDING W
ILL TAKE UP TO45 SECONDS PER YEA
R. PLEASE BE  PATIENT.":PRINT
540 IF O$="S" GOSUB 1350
550 IF O$="P" GOSUB 1400
560 IF C$="Q" GOSUB 800
570 IF C$="M" GOSUB 960
580 IF C$="D" GOSUB 1120
590 IF O$="P" GOTO 640
600 PRINT TAB(2)"TOTAL CONTRIBUT
ION:";
610 PRINT USING"**$###,###.";TC+
A
620 PRINT TAB(2) "INTEREST EARNE
D:";
630 PRINT USING "**$###,###.##";
(T-TC):GOTO700
640 PRINT#-2,"     TOTAL CONTRIB
UTIONS:";
650 PRINT#-2,USING"**$###,###.##
";TC+A;
660 PRINT#-2," INTEREST EARNED:"
;
670 PRINT#-2,USING "**$###,###.#
#";(T-TC)
680 PRINT#-2,"FOR A MAN AT 65 TH
IS WOULD RESULT IN MONTHLY PAYME
NTS OF $";
690 PRINT#-2,USING "**$##,###.##
";T/(12*6.56):REM ANOTHER APPROX
IMATION
700 PRINT:PRINT"TO RUN AGAIN WIT
HOUT INTRODUC-  TION,TYPE 'CLS:R
UN120-"
710 END
720 CLS:PRINT"FOR AN IRA, YOU CA
NNOT INVEST"
730 PRINT "MORE THAN $2000 PER Y
EAR AS A   WAGE EARNER, NOR MORE
 THAN $2250IF IT IS A JOINT ACCO
UNT WITH   ONLY ONE SPOUSE WORKI
NG."
735 PRINT"YOUR ";Z$;" CONTRIBUTI
ONS MAY NOT EXCEED $";(T4/M)
740 PRINT"HOWEVER A KEOGH ACCOUN
T CAN GO  MUCH HIGHER. DO YOU WI
SH TO       CHANGE YOUR AMOUNT?"
750 INPUT"Yes/No";T1$
760 IF T1$="N" THEN RETURN ELSE
IF T1$="Y"THEN C=0
770 INPUT "HOW MUCH";C
780 IF (C*M)>2000 AND T$="W" GOT
O 720 ELSE RETURN
790 IF (C*M)>2250 AND T$="S" GOT
O 720 ELSE RETURN
800 FOR L=1 TO Y:REM QUARTERLY L
OOP
810 IF D$="A" THEN T=T+C
```

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Rome, NY 13440

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SEND S.A.S.E. NOW!

```
820 FOR K=1 TO 12
825 IF D$="A" GOTO 870
830 IF D$="M" THEN T=T+C
835 IF D$="M" GOTO 870
840 FOR Z=1 TO 30
850 GOSUB 1700
860 NEXT Z
870 IF K=3 THEN T=T+T*(I/4)
880 IF K=6 THEN T=T+T*(I/4)
890 IF K=9 THEN T=T+T*(I/4)
900 IF K=12 THEN T=T+T*(I/4)
910 NEXT K
920 GOSUB 1290
930 S1=S1+1
940 NEXT L
950 RETURN
960 FOR L=1 TO Y:REM MONTHLY LOO
P
970 IF D$="A" THEN T=T+C
980 FOR K=1 TO 12
985 IF D$="A" GOTO 1050
990 IF D$="M" THEN T=T+C
995 IF D$="M" GOTO 1050
1000 FOR Z=1 TO 30
1010 GOSUB 1700
1040 NEXT Z
1050 I2=T*(I/12)
1060 T=T+I2
1070 NEXT K
1080 GOSUB 1290
1090 S1=S1+1
1100 NEXT L
1110 RETURN
1120 FOR L=1 TO Y:REM DAILY LOOP
1130 IF D$="A" THEN T=T+C
1140 FOR K=1 TO 12
1150 IF D$="M" THEN T=T+C
1160 FOR Z=1 TO 30
1170 GOSUB 1700
1180 I3=T*(I/360)
1190 T=T+I3
1200 NEXT Z
1210 NEXT K
1220 GOSUB 1290
1230 S1=S1+1
1240 NEXT L
1250 RETURN
1290 IF O$="P" GOSUB 1440
1300 PRINT:PRINT S1;"  CONTRIBUT
IONS:"
1310 PRINT USING"**$###,###.##";
E
1320 PRINT"YEAR-END TOTAL:";
1330 PRINT USING"**$###,###.##";
T
1340 RETURN
1350 PRINT "      IRA/KEOGH ESTI
MATOR"
```

```
1360 PRINT:PRINT:PRINT"THIS PROG
RAM RUNS FROM";S1 "TO ";S2;"."
1370 PRINT "INTEREST IS";(I*100)
;"% COMPOUNDED "
1380 PRINT C1$
1390 PRINT "WITH CONTRIBUTIONS M
ADE OF $";C;Z$:RETURN
1400 PRINT#-2,TAB(20)"IRA/KEOGH
ESTIMATOR"
1410 PRINT#-2:PRINT#-2
1420 PRINT#-2, "THIS PLAN RUNS F
ROM";S1;"TO";S2
1430 PRINT#-2,"INTEREST ASSUMED
IS ";(I*100);"%  COMPOUNDED ";C1
$;" WITH CONTRIBUTIONS OF $";C;Z
$:RETURN
1440 PRINT:PRINT#-2,S1,"  Contri
bution:";
1450 PRINT#-2,USING"**$###,###.#
#";E;
1460 PRINT#-2,"  YEAR-END TOTAL:
";
1470 PRINT#-2,USING"**$###,###.#
#";T
1480 RETURN
1490 PRINT"AN IRA IS A TAX-DEFER
RED WAY TO BUILD A NEST EGG FOR
YOUR RE-   TIREMENT. YOU MAY INV
EST UP TO"
1500 PRINT "$2000 OR UP TO 15% O
F YOUR EARN-ED INCOME,WHICHEVER
IS LOWER PERYEAR. COUPLES WITH T
WO INCOMES  MAY HAVE TWO IRAS,EA
CH SUBJECT"
1510 PRINT                      "
TO THE SAME MAXIMUMS. THERE IS A
'SPOUSAL' IRA FOR COUPLES WITH
ONLY ONE WAGE-EARNER. EACH must
HAVE AN IRA. THE MAXIMUM AMOUNT
IS THE LOWER OF 15% OF INCOME"
1520 PRINT                      "
OR $2250. THEY NEED NOT BE EQUAL
"
1530 INPUT"PRESS ENTER TO CONTIN
UE";Y$
1540 Y$=INKEY$:IF Y$=" " THEN 15
40 ELSE 1550
1550 CLS:PRINT                  "
THE MAXIMUM ALLOWED IN ANY ONE
ONE SPOUSAL ACCOUNT IS $2000."
1560 PRINT"  THE KEOGH PLAN IS
FOR SELF-  EMPLOYED PEOPLE AND A
LLOWS CON- TRIBUTIONS OF UP TO T
HE LOWER OF15% OR $30,000."
1570 PRINT"  YOU MAY START TO R
ECIEVE YOURFUNDS FROM EITHER PLA
N AT 59 1/2YEARS OF AGE AND YOU
MUST START"
```

```
1580 PRINT"BY 70 1/2.THE MONEY C
AN BE TAKENALL AT ONCE OR IN INS
TALLMENTS."
1590 PRINT"   THE MONEY WILL BE
TAXED AS   INCOME BUT YOU MAY BE
 IN A LOWERBRACKET AT THIS TIME.
"
1600 PRINT:INPUT"    PRESS ENTER
 TO CONTINUE";Y$
1610 Y$=INKEY$:IF Y$=" "THEN 161
0 ELSE 1730
1620 CLS:PRINT"   THIS IS BUT A
BRIEF OVERVIEW  OF THE IRA AND K
EOGH PLANS."
1630 PRINT"   CHECK ALL THE FACT
S WITH AN  ACCOUNTANT OR AN INVE
STMENT     PLANNER AT YOUR BANK,
S&L,CREDIT"
1640 PRINT                      "
UNION OR BROKERAGE HOUSE TO
AVOID ANY PROBLEMS. THERE ARE
SEVERE PENALTIES FOR EARLY WITH-
DRAWAL."
1650 PRINT                      "
  BUT THIS IS THE BIGGEST BREAK
THE 'LITTLE MAN' HAS EVER RE-
CIEVED FROM HIS GOVERNMENT."
1660 PRINT:PRINT
1670 INPUT"PRESS ENTER TO RUN TH
E PROGRAM";Y$
1680 Y$=INKEY$:IF Y$=" " THEN 16
80
1690 RETURN
1700 IF D$="T" AND Z=15 THEN T=T
+C
1710 IF D$="T" AND Z=30 THEN T=T
+C
1720 IF D$="B" AND Z=15 GOSUB 17
90
1730 IF D$="B" AND Z=30 GOSUB 17
90
1740 IF D$="W" AND Z=7 GOSUB 179
0
1750 IF D$="W" AND Z=14 GOSUB 17
90
1760 IF D$="W" AND Z=21 GOSUB 17
90
1770 IF D$="W" AND Z=28 GOSUB 17
90
1780 RETURN
1790 T=T+(C*1.083):RETURN:REM AP
PROXIMATION TO ADJUST BI-WEEKLY
AND WEEKLY CONTIBUTIONS TO MONTH
LY LOOP
```

FIGHTER PILOT

Fighter Pilot

An original arcade game! Wave after wave of attacking aircraft attempt to shoot you down as you maneuver your fighter into the wild blue yonder, blasting enemy fighters, bombers and paratroopers out of the sky. Joystick or keyboard operation. "Pause game" feature. Disk version saves high scores. 32K, 100% Machine Language.

Tape $24.95
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You'll dig this 100% machine language arcade game! The Pumpman carries a pump that he fires at aliens Pooky and Dragon as they change forms and chase him around under the ground. 15 different screens, "pause game" feature. As fun and challenging as the original arcade version! 32K, one joystick required.

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A fantasy graphics adventure. You are Garotte Severinn, master thief, spy, and assassin. Your mission is to kill the evil wizard Neeman, recover the holy scepter of Tash, and escape from Neeman's castle. The reward is a fortune in gold, but beware...many dragons and monsters stand between you and the gold! 32K, one disk drive required.

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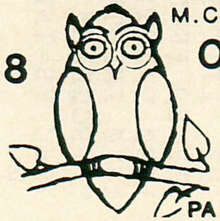

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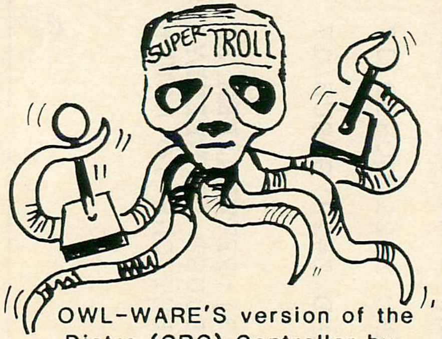

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2 UTILITIES
2 GAMES

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Several months ago OWL-WARE introduced the Finest OS9 Hard Drive System for the Color Computer. Now we are about to introduce the only RSDOS Interface System worthy of our computer, OWL-WARE Winchester Basic. For the first time you have available a true Winchester System. Although there are 10 directories made available to BASIC, the only limit to size of any file is the size of your drive. On a 10 meg drive you could have a 8 meg file on directory 5 and a 1 meg file on directory 8 and small files everywhere. You turn the computer on and you can immediately access your drive from BASIC or any language using commands you already know. You do not have to know or use OS9 to use OWL-WARE WINCHESTER BASIC, but if you do, all files saved from RSDOS are available to OS9. All files generated from OS9 can be made available to RSDOS by copying to the WINCHESTER BASIC directories. There are no partitions to wall you into only one operating system, but nothing forces you to use an operating system you don't like.

Call for further details and availability on this breakthrough product!!!

Prices

WITH DRIVE BELOW	**$35.** Until Feb. 28th	**WITHOUT DRIVE**	**$50.** Until Feb. 28th
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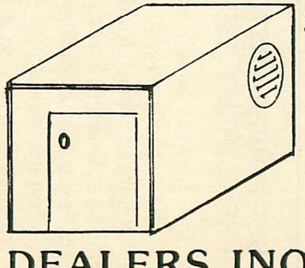

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NOTE: Interface is not Interrupt Driven Like Our Competition. Therefore, the System Clock does not Lose Time During Hard Drive Access.

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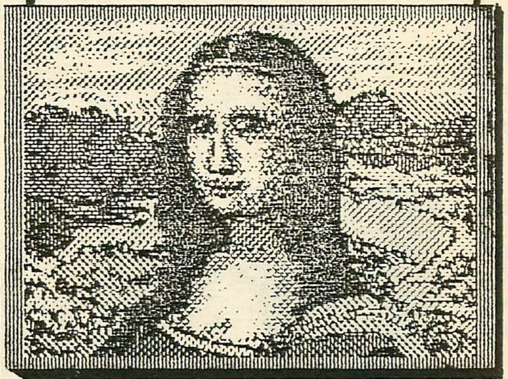

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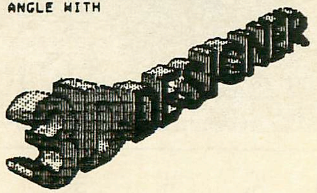

- Convenient, on-screen menu
- Supports input from X-PAD, TOUCH-PAD, MOUSE or JOYSTICK
- Built-in screen dump to Tandy printers
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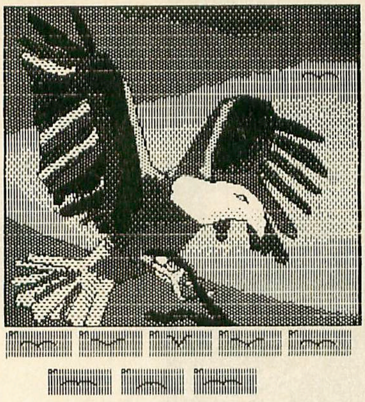

THE MOTION PICTURE

A complete animation development system for your CoCo! An object oriented graphic screen developer. Using this tool you can quickly and simply animate your pictures. Take standard graphic screens that you develop and incorporate them into MOTION PICTURES. Animate up to eight frames, yielding smooth animation. Generate screens from objects and build screens from stored object files. Included are routines to display animation from BASIC. We believe you'll like this program, so we make this offer: We will send you a demonstration disk for $4.00 which you can apply as a credit if you buy the program. Requires 64K. Disk, $39.95.

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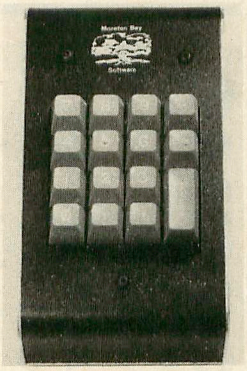

DOUBLE DRIVER I

The BEST monitor driver available. Color composite, monochrome and audio output. For original CoCo D, E and F boards. $24.95.

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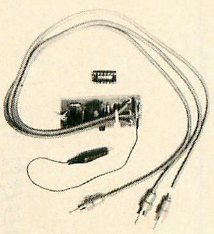

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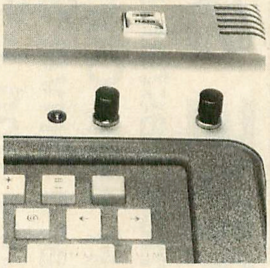

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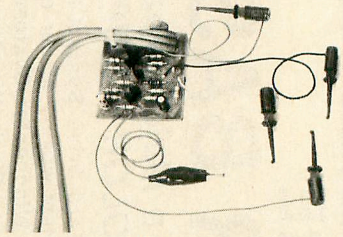
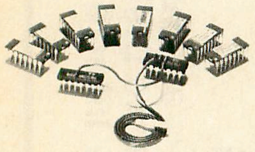


64K UPGRADES



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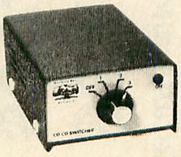

The CoCo Switcher allows you to hook up three peripherals to your RS-232 jack. Connect your modem, printer and any other RS-232 compatible peripheral to the CoCo Switcher. An LED on the CoCo Switcher shows if your computer is on or off at a glance, The LED flickers when transmitting or receiving data.

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Are you selling your home and need to find out a fair asking price? With a few simple questions answered, it's easy to figure

Assessing the Market Value of Your Home

By Harry W. Hallstrom

Back a couple of years ago I was interested in selling my home, but not quite sure what I should be asking as a fair price. The first thing I did, as I'm sure just about everyone does, was get out the phone book. After a careful selection of three real estate agents, I gave each one a call. When all were met and given the grand tour each asked me, "What are you asking as a selling price range?" Now wait a minute, I thought, they are supposed to tell me what a good asking price is. In time they all did, but they were all different. The price spread was almost $20,000 on a house that is about $120,000 in value. That's when I decided there must be a better way to accurately determine the true market value of a home.

After thinking about it for several weeks, I realized that all real estate is assessed by the city or town to which you pay taxes. Most cities/towns also reassess properties every so often — 10 years seems to be the average time span between assessments. With that information, I wrote *House Value* to help determine the current market value of a piece of property. Three pieces of information are required to run the program: What year did you purchase your home or when was it last assessed, at how much was it assessed and what is the percentage of assessment?

Most homeowners know the answers to these three questions. If you do not know, there are several ways to find out. The first is to call the city hall and ask the tax collector. Another way is to call the bank holding the mortgage on your home and ask if they can help you with those questions. If you get an itemized tax bill, usually the assessed value and percentage of asessment is furnished on the bill.

House Value takes the assessed value and determines the actual value based on the percentage of assessment. Once that is determined, the national inflation rate is added to each year from the year of purchase or last assessment to the present year.

How the Program Works

Type in the listing and save a copy to disk or tape before running. You are greeted with a title screen and the first data entry point, "year home was bought?" Enter the year your home was purchased or the last year of assessment, which ever is later. For example, if your home was purchased in 1968 but reassessed in 1975, then enter 1975. You must enter a year between 1968 and 1985, and as a four-digit year. Lines 13 through 17 look for this entry and verify if the year is between 1968 and 1985. I used 1968 as the earliest year allowed, figuring most real estate property has at least been reassessed since that time.

The next data entry point is "assessed value at purchase?" Here again, this means at the time of purchase or latest assessment. Enter this figure as a dollar figure (the '$' sign is not necessary). Keep in mind if you have added something permanent to the property since buying or assessment to add that to the assessed value. Suppose you added a $5,000 solar system last year; by all means add $5,000 to the assessed value. Lines 18 through 21 look for this entry.

The last piece of information you have to enter is the "percent of assessment?" Lines 22 through 26 look for this data. Lines 27 through 31 perform the necessary mathematical calculations to determine present value. Once the assessment figure is entered the screen

---

Harry Hallstrom is a self-taught computer programmer and hobbyist who works in a large telecommunications company as a CAD/CAM designer using a VAX 11/780. He has an associate's degree in mechanical engineering and lives in Northfield, Connecticut with his wife and two daughters.

redisplays the data and the true market value based on 100 percent assessment. You are prompted to hit any key to continue. Lines 27 through 36 perform this function. You are then asked if you want a screen listing of "house value each year" or "present value?" Lines 37 through 43 look for a keyboard entry and verify it is the correct key input.

Lines 44 through 62 are the years from 1968 to 1985. Based on your earlier input the program continues down the lines until it finds the year match. At that point, the new market value is calculated based on the national inflation rate. Note that Line 62 assumes an inflation rate of 4 percent. When the exact figures are published by the federal government you might want to correct this line. In any case, they won't be far from 4 percent. Lines 63 through 67 display the "present market value" with a pause for user input to run the program again or end. Lines 68 through 71 restart the program or end it, depending on your input. Lines 72 through 76 are the subroutine used to cycle through each year if you selected a yearly listing of the increasing market value.

House Value can easily be modified to direct the data to a printer. I didn't have any need for that, so it wasn't done. Feel free to use and modify this program any way you wish. If there is enough interest in a printer version I will work something out and perhaps add it as a later article.

(Any questions you may have about this program can be sent to the author at Marsh Road, Northfield, CT 06778. Please enclose an SASE for a reply.) ☐

```
19 ........57
41 ........31
32 ........12
63 ........41
END .....163
```

The listing: HOUSEVAL

```
1 ' PROG NAME 'HOUSEVAL.BAS'
2 '
3 ' HARRY W. HALLSTROM
4 ' MARSH ROAD
5 ' NORTHFIELD, CT. 06778
6 '
7 ' VERSION 1.6
8 '
9 CLS:EY=0
10 PCLEAR1:CLEAR1000
11 CL$=STRING$(254,32)
12 FOR I=1029TO1050:READX:POKEI,
X:NEXT:FOR I=1065TO1078:READX:PO
KEI,X:NEXT:FOR I=1094TO1113:READ
X:POKEI,X:NEXT
13 PRINT@96,STRING$(32,&H3D);
14 PRINT@165,"YEAR HOME WAS BOUG
HT":PRINT@198,"'YYYY' ";:LINEINP
UT YR$
15 IF YR$<"1968" OR YR$>"1985"TH
EN SOUND200,3:PRINT:PRINTTAB(1)"
ENTER A YEAR BETWEEN 1968-1985":
FORT=1TO3000:NEXT:PRINT@128,CL$:
GOTO14
16 IF LEN(YR$)<4 OR LEN(YR$)>4 T
HENPRINT@128,CL$:GOTO14
17 YR=VAL(YR$)
18 PRINT@160,CL$
19 PRINT@163,"ASSESSED VALUE AT
PURCHASE
20 PRINT@203,"$";:LINEINPUT AV$
21 IF LEN(AV$)=<0 THENPRINT@128,
CL$:GOTO19
22 PRINT@160,CL$
23 PRINT@169,"% OF ASSESSMENT
24 PRINT@210,"%":PRINT@207,;:LIN
EINPUT AA$
25 AA=VAL(AA$):IF AA=<0 OR AA>10
0 THENPRINT@128,CL$:GOTO23
26 PRINT@160,CL$
27 AV=VAL(AV$):AA=VAL(AA$)
28 IF AA=100THEN 31
29 AA=100-AA
30 NV=AV*(AA/100):MV=AV+NV:GOTO3
2
31 MV=AV
32 PRINT@165,"HOUSE PURCHASED: "
;YR$
33 PRINT@229,"ASSESSED VALUE";:P
RINTUSING" $###,###";AV
34 PRINT@290,"MARKET VALUE";YR;:
PRINTUSING"$###,###";MV
35 PRINT@394,"HIT ANY KEY
36 EXEC44539
37 PRINT@160,CL$
38 PRINT@166,"LIST VALUE eACH YE
AR
39 PRINT@207,"OR
40 PRINT@231,"LIST pRESENT VALUE
41 PRINT@327,"ENTER e  OR  p  ";
:LINEINPUT A$
42 IF A$="E" THEN EY=1 ELSE IF A
$="P"THEN 43 ELSE41
43 PRINT@128,CL$
44 IF YR=1968 THEN SV=MV*.042:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=4.2%
45 IF YR=1969 THEN SV=MV*.054:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=5.4%
46 IF YR=1970 THEN SV=MV*.055:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=5.5%
47 IF YR=1971 THEN SV=MV*.034:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=3.4%
```

```
48 IF YR=1972 THEN SV=MV*.034:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=3.4%
49 IF YR=1973 THEN SV=MV*.088:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=8.8%
50 IF YR=1974 THEN SV=MV*.122:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=12.2%
51 IF YR=1975 THEN SV=MV*.07:MV=
MV+SV:YR=YR+1:IF EY=1 THEN GOSUB
72  'INFLATION=7%
52 IF YR=1976 THEN SV=MV*.048:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=4.8%
53 IF YR=1977 THEN SV=MV*.068:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=6.8%
54 IF YR=1978 THEN SV=MV*.09:MV=
MV+SV:YR=YR+1:IF EY=1 THEN GOSUB
72  'INFLATION=9%
55 IF YR=1979 THEN SV=MV*.133:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=13.3%
56 IF YR=1980 THEN SV=MV*.124:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=12.4%
57 IF YR=1981 THEN SV=MV*.089:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=8.9%
58 IF YR=1982 THEN SV=MV*.039:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=3.9%
59 IF YR=1983 THEN SV=MV*.038:MV
=MV+SV:YR=YR+1:IF EY=1 THEN GOSU
B72 'INFLATION=3.8%
60 IF YR=1984 THEN SV=MV*.04:MV=
MV+SV:YR=YR+1:IF EY=1 THEN GOSUB
72 'INFLATION=4.0%
61 PRINT@128,CL$
62 IF YR=1985 THEN SV=MV*.04:MV=
MV+SV:YR=YR+1:IF EY=1 THEN GOSUB
72 'INFLATION=4.0%
63 PRINT@128,CL$
64 PRINT@166,"PRESENT VALUE @";Y
R
65 PRINT@235,USING"$#,###,###";M
V
66 PRINT@362,"HIT ANY KEY
67 EXEC44539
68 PRINT@160,CL$
69 PRINT@325,"     RUN AGAIN  y/n
70 A$=INKEY$:IF A$=""THEN70
71 IF A$="Y"THEN9 ELSE IF A$="N"
THENCLS:PRINTTAB(9)"PROGRAM ENDE
D":END ELSE70
72 IF YR=1986 THEN GOTO 63:PRINT
@128,CL$
73 PRINT@196,"VALUE @";YR;"=";:P
RINTUSING" $###,###";MV
74 PRINT@325,"HIT ANY KEY TO ADV
ANCE
75 EXEC44539
76 RETURN
77 DATA 72,79,85,83,69,96,86,65,
76,85,69,96,67,65,76,67,85,76,65
,84,79,82
78 DATA 66,89,96,72,110,72,65,76
,76,83,84,82,79,77
79 DATA 86,69,82,96,113,110,118,
96,96,96,96,96,91,67,93,96,113,1
21,120,116
```

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```
JOBS FILE PARTIAL PRINTOUT
------------------------------
HOME
  HOUSE MAINTENANCE
    Change kitchen washers
    Paint utility room
    Replace light bulbs
    Check smoke alarm ****
    Car service MON 9AM
  YARD
    Prune hedge, shrubs
    Gate hinges - fix
    Clean out eave troughs
    Marigolds-seed MAR 1st

ENGINEERING
  PROJECT '200
    Preliminary plan
    etc. . .
```

3 sample files are included (see left)

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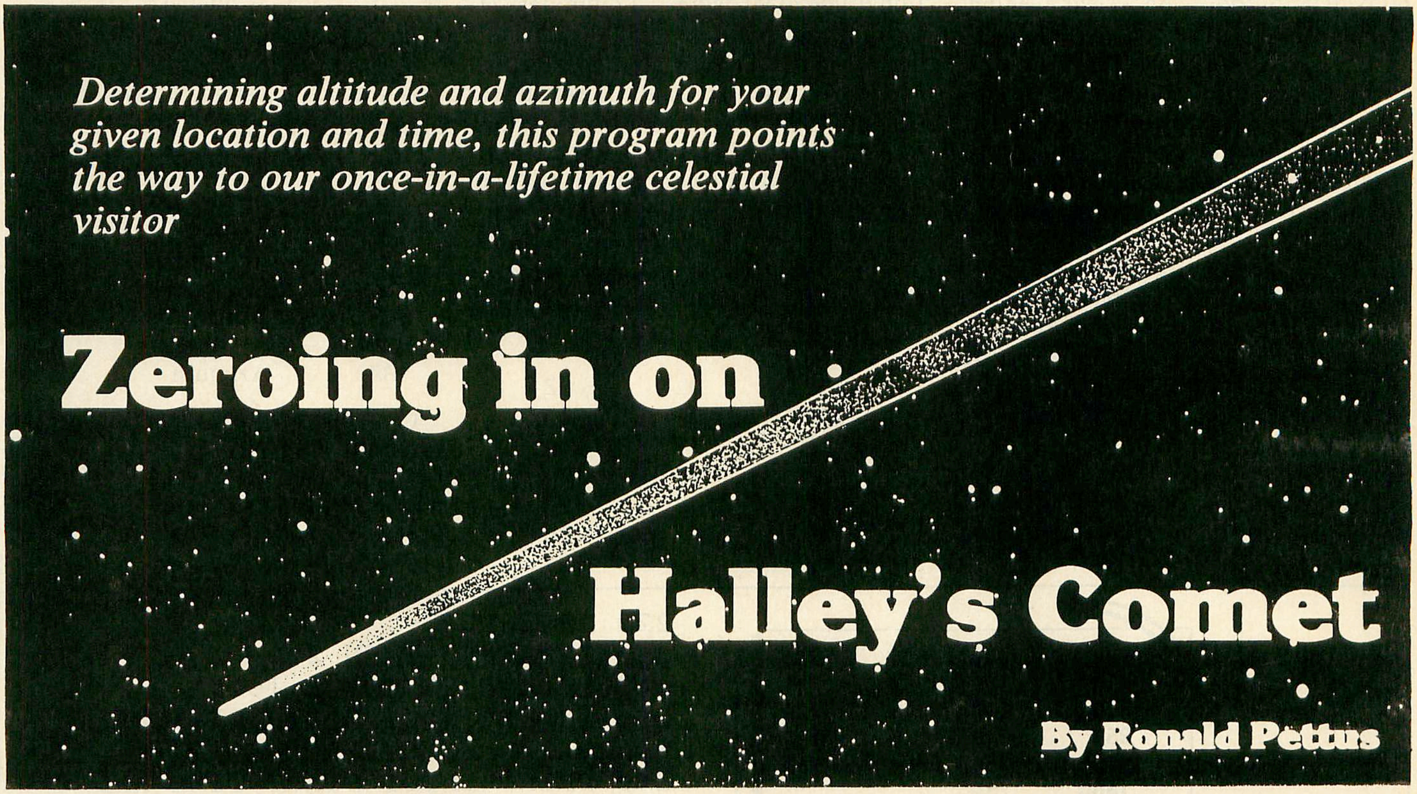

Determining altitude and azimuth for your given location and time, this program points the way to our once-in-a-lifetime celestial visitor

Zeroing in on Halley's Comet

By Ronald Pettus

Comet Halley and its elongated tail filled the nightly heavens during the 1910 appearance. Halley's current visit finds it farther from the earth and thus much fainter. In fact, astronomers judge it the least spectacular appearance in 2,000 years and we won't see it again for 76 years. Light "pollution" in modern cities will further thwart suburban comet watchers.

Halley will be visible again, low in the southern sky, during the months of February, March and April of this year. The best aids for viewing this once-in-a-lifetime phenomenon are dark skies, binoculars mounted on a camera tripod and knowledge of exactly where to look.

The BASIC program, *HALLEY86*, computes the comet's exact location for your locale, date and local time. The comet's coordinates are given as an altitude and an azimuth.

Ron Pettus works in the field of operations analysis and holds a degree in physics. His hobbies include astronomy and volunteer work at a science museum. He and his teenage son, Jason, have co-owned a Color Computer for four years.

Altitude and Azimuth

To better understand altitude and azimuth, picture yourself standing inside a large circle marked off into 360 equal segments and numbered zero to 359. When you face the segment marked zero you are looking due north. As you turn to the east the numbers increase, and at due east you are looking at the segment numbered 90. The numbers continue to increase as you turn and at due south the number is 180. Facing west the number has increased to 270. This describes azimuth, which corresponds to conventional compass headings ranging from zero to 360 degrees.

Now, hold your arm straight out and point to the horizon. This corresponds to an altitude of zero. Start moving your arm up. As your arm moves upward the altitude increases, and halfway between the horizon and straight up the altitude is 45. Eventually, with your arm pointing straight up, the altitude is 90 (its maximum value).

Using the Program

For a 16K computer, `PCLEAR1` to provide enough memory. The program first asks if a printer is connected, then offers the opportunity to enter a temporary latitude and longitude representing your location: WANT TO CHECK LAT & LONG? To permanently store your location in the program, modify lines 110 and 120. Line 110 contains your Hour Angle (longitude divided by 15) and Line 120 your latitude. Both values must be in decimal form. If you find longitude or latitude in degrees, minutes and seconds, divide the minutes by 60 and seconds by 3,600 and add both to degrees. Your value is now in decimal. You can find the latitude and longitude of many cities in an almanac, atlas, or even from a local airport.

Next, you are asked a series of questions requiring month, day, year, time and time zone for use in the computations. The program accepts standard and daylight time for Eastern, Central, Mountain and Pacific time zones. For other zones modify lines 280-390. Use the 24-hour time system for inputs. For example, 3:15 a.m. is 0315 and 10:30 p.m. is 2230. In other words, add 1200 to the time beginning with 1 p.m.

You now choose Halley's comet ('H') or ask for the location of some other celestial object ('O'). When you select Halley's comet, the rest of the operation is automatic. If you select some other object, you must enter Right Ascension and Declination coordinates for the object from an almanac or astronomy magazine.

At this point the program prints the azimuth and altitude for eight 15-minute intervals. It also makes a paper copy if you have a printer.

Using Altitude and Azimuth

Now, how do you use this information to find Halley's comet? Take your binoculars outdoors on a clear evening, as far from city lights as possible, with your listing of altitudes and azimuths. Using the azimuth coordinate, turn to the correct direction. Then tilt the binoculars to the correct altitude or elevation. A negative altitude means the object is below the horizon and not visible.

This process is quicker and more accurate if you use a compass or, better yet, mount your binoculars on a camera tripod and make a pair of "setting circles." A pair of inexpensive plastic protractors are easily converted for this use. An article by Paul Burke describing homemade setting circles and the theory of altitude-azimuth conversion appears in the April 1982 issue of *Astronomy* magazine.

Checking the Program

Here is a sample calculation to check the program if you typed it in. Use a Longitude of 90 degrees, 12 minutes, 21 seconds and Latitude of 38 degrees, 37 minutes, 45 seconds (for St. Louis, Missouri). Use the date 1,1,84 and a time of 2000,C (8 p.m. Central Standard Time). Select 'O' (Other Object) and enter the following coordinates for the star Betelgeuse in Orion: Right Ascension (hours) = 5, Right Ascension (minutes) = 54; Declination (degrees) = 7, Declination (minutes) = 24. Your display should be:

```
TIME        ALT      AZ
2000        36       113
2015        39       116
2030        42       120
2045        44       123
2100        47       128
2115        49       132
2130        51       137
2145        53       142
2200        54       148
```

If it doesn't look like this check lines 1100-1400.

Several abbreviations appear on the screen display of this program. They are interpreted below.

RA	—	Right Ascension
DEC	—	Declination
DEG	—	Degrees
MIN	—	Minutes
SEC	—	Seconds
HR	—	Hours
ALT	—	Altitude
AZ	—	Azimuth

(You may contact the author of this program with any questions at 1228 Fordyce Lane, St. Charles, MO 63303; phone 314-946-7848 after 6 p.m. MST. Please enclose an SASE when writing.) □

220 ......**102**
470 ......**106**
690 ......**140**
950 ....**49**
1150 .....**238**
1380 ......**54**
1620 .....**231**
1987 ......**85**
2060 ......**26**
2093 .....**250**
END **183**

The listing: HALLEY86

```
10 'HALLEY FINDER
20 '1986
30 'BY RONALD PETTUS
40 CLS:PRINT @ 195,"   HALLEY'S
COMET FINDER"
50 PRINT @ 262,"         1986"
60 PRINT @ 295,"BY RONALD PETTUS
"
70 FOR I=1 TO 1500
80 NEXT I
90 CLS
100 CLEAR 100
110 DATA 6.0137407
120 DATA 38.629167
130 DIM M$(308),K(19)
140 PRINT"PRINTER ON? (Y/N)"
150 PP$=INKEY$
160 IF PP$="" THEN 150
170 CLS:PRINT @ 234,"LOADING DAT
A"
180 READ LC,LX 'READ HOUR ANGLE
& LAT FROM LINES 110 & 120
190 FORI=0 TO 18:READK(I):NEXTI
'READ YEAR FACTORS FROM LINES 19
82-2000
200 CLS
210 PRINT"WANT TO CHECK LONG & L
AT?(Y/N)"
220 A$=INKEY$
230 IF A$="" THEN 220
240 IF A$="Y" GOSUB 1610
250 INPUT"INPUT MONTH,DAY,YEAR(X
X,XX,XX)";MO,DY,YR
260 PRINT"INPUT START TIME AND T
IME ZONE."
270 PRINT"USE 24 HOUR TIME AND T
HE ZONES:"
280 INPUT"E,C,M,P,ED,CD,MD,PD";S
T,ZN$
290 '**
300 '** ADJUST FOR TIME ZONE
310 '**
320 IF ZN$="E" THEN U=5
330 IF ZN$="C" THEN U=6
340 IF ZN$="M" THEN U=7
350 IF ZN$="P" THEN U=8
360 IF ZN$="ED" THEN U=4
370 IF ZN$="CD" THEN U=5
380 IF ZN$="MD" THEN U=6
390 IF ZN$="PD" THEN U=7
400 '**
410 '** MENU AND SELECTION ROUTI
NE
420 '**
430 PRINT"DO YOU WANT HALLEY'S C
OMET      OR OTHER OBJECT(H/O)?
440 D$=INKEY$
450 IF D$="" THEN  440
460 IF D$="O" THEN  820
470 IF D$="H" THEN 490
480 'FUTURE USE
490 IF CK=1 THEN 530
500 CLS:PRINT @ 234,"LOADING DAT
A"
510 FOR I=1 TO 74:READ M$(I):NEX
```

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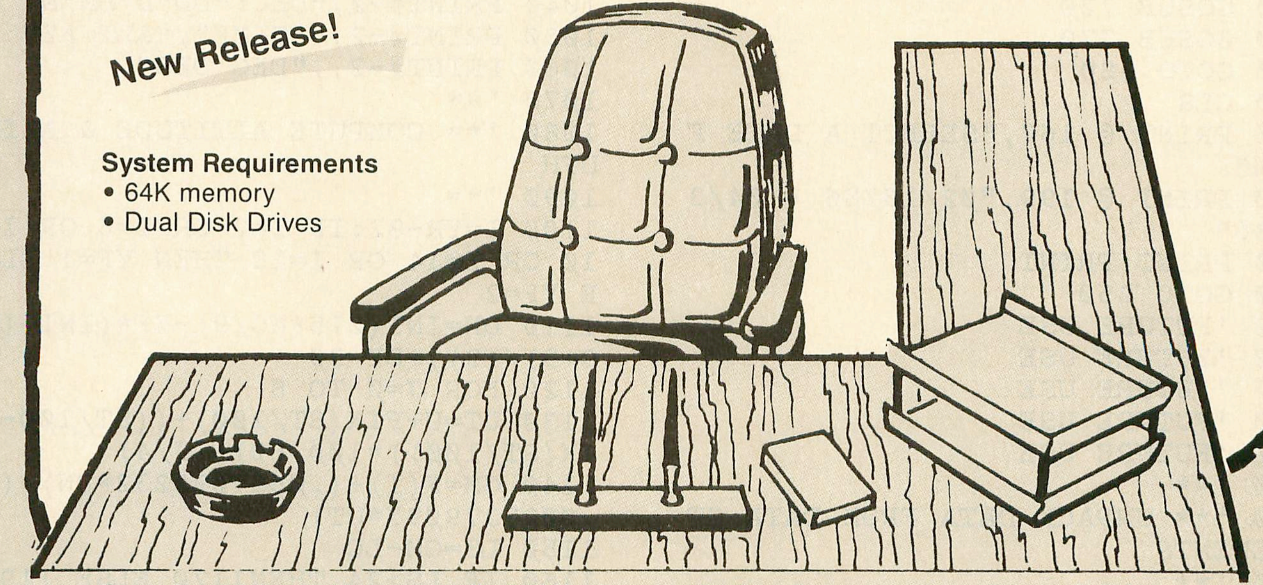

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```
T I 'READ HALLEY DATA FROM LINES
 2047-2120
520 CK=1
530 DN=INT(275*MO/9)-2*(INT((MO+
9)/12))+DY-30
540 A=DN-46:IF A<1 OR A>74 OR YR
<86 OR YR>86 THEN 580
550 GOSUB 720
560 GOSUB 770
570 GOTO 880
580 CLS
590 PRINT @ 167,"SELECT A DATE F
ROM"
600 PRINT @ 199,"02/16/86 - 04/3
0/86"
610 PRINT:PRINT
620 GOTO 250
630 'FUTURE USE
640 'FUTURE USE
650 'FUTURE USE
660 'FUTURE USE
670 'FUTURE USE
680 '**
690 '** UNPACK DATA FROM DATA ST
ATEMENTS
700 '**
710 'FUTURE USE
720 RH=VAL(LEFT$(M$(A),2))
730 RM=VAL(MID$(M$(A),3,2))
740 DD=VAL(MID$(M$(A),5,3))
750 DM=VAL(MID$(M$(A),8,2))
760 RETURN
770 NA$="HALLEY'S COMET":RETURN
780 'FUTURE USE
790 '**
800 '** INPUT FOR OTHER OBJECTS
810 '**
820 INPUT"INPUT OBJECT NAME";NA$
830 INPUT"INPUT RIGHT ASCENSION(
HRS,MIN)";RH,RM
840 INPUT"INPUT DECLINATION(DEG,
MIN)";DD,DM
850 '**
860 '** SCREEN LIST ROUTINE
870 '**
880 CLS
890 PRINT"DATE:"MO"/"DY"/"YR;
900 PRINT"TIME ZONE:"ZN$
910 PRINT"OBJECT:"NA$
920 PRINT"RA:";RH;"H"RM;"M ";
930 PRINT TAB(13)"DEC:"DD"D"DM"M
"
940 PRINT TAB(3)"TIME";TAB(12)"A
LTITUDE";TAB(24)"AZIMUTH"
950 PRINT TAB(13)"(DEG)";TAB(25)
"(DEG)"
960 '**
970 '** PRINTER ROUTINE
980 '**
```

```
990 IF PP$<>"Y" THEN 1100
1000 PRINT#-2,"DATE:"MO"/"DY"/"Y
R;
1010 PRINT#-2,"TIME ZONE:"ZN$
1020 PRINT#-2,"OBJECT:"NA$
1030 PRINT#-2,"RA:";RH;"H"RM;"M
";
1040 PRINT#-2,"DEC:"DD"D"DM"M"
1050 PRINT#-2," TIME","ALT AZ"
1060 PRINT#-2,,"DEG DEG"
1070 '**
1080 '** COMPUTE ALTITUDE & AZIM
UTH
1090 '**
1100 I=YR-82:IF I=2 OR I=6 OR I=
10 OR I=14 OR I=18 THEN YF=1 ELS
E YF=2
1110 DN=INT(275*MO/9)-YF*(INT((M
O+9)/12))+DY-30
1120 FOR J=0 TO 8
1130 UT=U+FIX(ST/100)+((ST/100-F
IX(ST/100))*100/60)+(J/4)
1140 GM=K(I)+(.0657098232*DN)+(1
.0027379093*UT)
1150 LS=GM-LC
1160 IF LS>24 THEN1170 ELSE 1190
1170 LS=LS-24
1180 GOTO 1160
1190 LS=LS*15
1200 RA=(RH+(RM/60))*15
1210 HA=LS-RA
1220 DE=SGN(DD)*(ABS(DD)+DM/60)
1230 R=57.29577951
1240 DR=DE/R:LR=LX/R:HR=HA/R
1250 X=((SIN(DR)*SIN(LR))+(COS(D
R)*COS(LR)*COS(HR)))
1260 IF X=1 OR X=-1 THEN1270 ELS
E X=X-FIX(X)
1270 AR=ATN(X/SQR(-X*X+1))
1280 AL=AR*R
1290 X=((SIN(DR)-SIN(LR)*SIN(AR)
))/(COS(LR)*COS(AR))
1300 IF X=1 OR X=-1 THEN1310 ELS
E X=X-FIX(X)
1310 ZR=-ATN(X/SQR(-X*X+1))+1.57
08
1320 AZ=ZR*R
1330 IF HA>0 THENAZ=360-AZ
1340 UT=(FIX(UT-U)*100)+(UT-FIX(
UT))*60:IF UT>2400 THEN UT=UT-24
00
1350 AL=FIX(((AL*10)+.5)/10)
1360 AZ=FIX(((AZ*10)+.5)/10)
1370 PRINT TAB(2)UT;TAB(14)AL;TA
B(25)AZ
1380 IF PP$<>"Y" THEN 1400
1390 PRINT#-2,UT,AL;AZ
1400 NEXT J
1410 '**
```

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```
1420 '** CHECK FOR NEW INPUTS
1430 '**
1440 PRINT"ANOTHER OBJECT?(Y/N)"
1450 A$=INKEY$
1460 IF A$="" THEN 1450
1470 IF A$="Y" THEN 1480 ELSE 15
70
1480 CLS
1490 PRINT"ANOTHER TIME?(Y/N)"
1500 B$=INKEY$
1510 IF B$="" THEN1500
1520 IF B$="Y" THEN 1530 ELSE 43
0
1530 PRINT"ANOTHER DATE?(Y/N)"
1540 C$=INKEY$
1550 IF C$="" THEN 1540
1560 IF C$="Y" THEN 250 ELSE 260
1570 END
1580 '**
1590 '** CHECK AND CHANGE LAT &
LONG
1600 '**
1610 LD=FIX(LC*15)
1620 LM=FIX((LC*15-LD)*60)
1630 LI=LM/60
1640 LS=INT((LC*15-(LD+LI))*3600
)
1650 L1=FIX(LX)
1660 L2=FIX((LX-L1)*60)
1670 LI=L2/60
1680 L3=INT((LX-(L1+LI))*3600)
1690 PRINT"LONG:";LD;"D"LM;"M"LS
;"S          LAT:";L1;"D"L2;"M
"L3;"S"
1700 PRINT"WANT TO CHANGE LONG?(
Y/N)"
1710 A$=INKEY$
1720 IF A$="" THEN 1710
1730 IF A$="N" THEN 1760
1740 INPUT "INPUT LONG(XX,XX,XX)
DEG,MIN,SEC";LD,LM,LS
1750 LC=(LD+LM/60+LS/3600)/15
1760 PRINT"WANT TO CHANGE LAT?(Y
/N)"
1770 A$=INKEY$
1780 IF A$="" THEN 1770
1790 IF A$="N" THEN 1820
1800 INPUT "INPUT LAT(XX,XX,XX)D
EG,MIN,SEC";L1,L2,L3
1810 LX=(L1+L2/60+L3/3600)
1820 RETURN
1982 DATA 6.62240808
1983 DATA 6.60649392
1984 DATA 6.59057904
1985 DATA 6.64037496
1986 DATA 6.62446008
1987 DATA 6.60854592
1988 DATA 6.59263200
1989 DATA 6.64242696
1990 DATA 6.62651304
1991 DATA 6.61059792
1992 DATA 6.59468400
1993 DATA 6.64447896
1994 DATA 6.62856504
1995 DATA 6.61265112
1996 DATA 6.59673600
1997 DATA 6.64653192
1998 DATA 6.63061704
1999 DATA 6.61470312
2000 DATA 6.59878800
2047 DATA 2051-1208
2048 DATA 2049-1225
2049 DATA 2048-1242
2050 DATA 2046-1259
2051 DATA 2044-1317
2052 DATA 2042-1335
2053 DATA 2041-1353
2054 DATA 2039-1412
2055 DATA 2037-1431
2056 DATA 2035-1450
2057 DATA 2034-1510
2058 DATA 2032-1530
2059 DATA 2030-1551
2060 DATA 2029-1612
2061 DATA 2027-1634
2062 DATA 2025-1656
2063 DATA 2023-1719
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2067 DATA 2016-1857
2068 DATA 2014-1924
2069 DATA 2012-1952
2070 DATA 2010-2021
2071 DATA 2007-2051
2072 DATA 2005-2123
2073 DATA 2003-2156
2074 DATA 2000-2230
2075 DATA 1957-2306
2076 DATA 1954-2344
2077 DATA 1951-2424
2078 DATA 1948-2507
2079 DATA 1944-2551
2080 DATA 1941-2638
2081 DATA 1937-2728
2082 DATA 1932-2820
2083 DATA 1927-2916
2084 DATA 1922-3015
2085 DATA 1916-3117
2086 DATA 1909-3223
2087 DATA 1902-3333
2088 DATA 1854-3446
2089 DATA 1845-3603
2090 DATA 1835-3723
2091 DATA 1824-3845
2092 DATA 1811-4009
2093 DATA 1757-4134
2094 DATA 1740-4256
2095 DATA 1722-4414
2096 DATA 1702-4524
2097 DATA 1640-4623
2098 DATA 1616-4706
2099 DATA 1551-4730
2100 DATA 1524-4732
2101 DATA 1458-4709
2102 DATA 1432-4624
2103 DATA 1407-4517
2104 DATA 1344-4353
2105 DATA 1323-4215
2106 DATA 1303-4028
2107 DATA 1246-3836
2108 DATA 1231-3643
2109 DATA 1218-3450
2110 DATA 1206-3300
2111 DATA 1156-3114
2112 DATA 1146-2934
2113 DATA 1138-2759
2114 DATA 1130-2630
2115 DATA 1124-2506
2116 DATA 1118-2348
2117 DATA 1113-2235
2118 DATA 1108-2127
2119 DATA 1104-2024
2120 DATA 1100-1925
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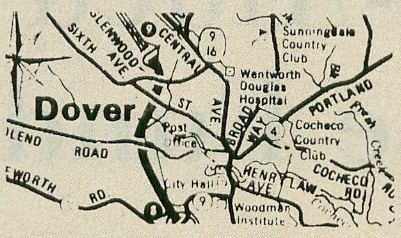

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The Computer-Aided College Expense Fund

By Jerry R. Whittlesey

With the cost of a college education skyrocketing and the student loan program drying up, parents who aspire to a college education for their children are recognizing the need for a college expense fund. Some already have a "nest egg" for that purpose. Others are setting up a fund to which they will make regular contributions.

This program, *College Expense*, permits forward-looking parents to explore their options based on certain assumptions. The user enters the amount of the "nest egg," called "initial deposit," the interest rate expected, the planned annual contribution to the fund and the expected annual costs when the kids are in college.

Based on these assumptions, the program displays the balance in the fund at the beginning and end of each year. As an option, the program also provides a printout of the starting balance, annual contributions (deposits), interest earned, expenses and the ending balance for each year from the present through the graduation of the youngest child.

The program is customized to reflect the author's situation (two children, one of whom will start college in the fall of 1986; the other in 1989). However, it may easily be adapted to any situation.

To customize *College Expense*, it's best to start by charting the educational events from this year forward. Here is a chart of the author's circumstances:

	#1	#2	
1985			None in college — no expenses.
1986	½		One in college half-year — no loop required.
1987	1		One in college full year — two-year loop.
1988	1		One in college full year — two-year loop.
1989	1	½	One full year: one half year — two-year loop.
1990	½	1	One full year: one half year — two-year loop.
1991		1	One in college full year — two-year loop.
1992		1	One in college full year — two-year loop.
1993		½	One in college half-year — no loop required.

With these circumstances in mind, let's take a look at how the program works.

Lines	**Function**
20-50	Asks for input of the four variables. Holds the initial deposit amount for use in lines 280 and 550. Converts interest to a percentage.
60	Used to format screen. If you do not have `PRINT USING`, just change Line 220 to `PRINT X,A,F:RETURN`.
210	This subroutine calculates interest (note that it assumes a mid-year contribution and simplistically credits the fund with only one-half a year's interest for that year's contribution). It then calculates the balance for the year (R) before expenses.
80-220	Calculation section. If the circumstance occurs only once (1985,1986 and 1993), 'X' is assigned the value of that year, no `FOR X=` loop is set up, and no `NEXT X` is required at the end of the line. The `F=` part of the line is the key component (see chart). 'D' is the expected cost or expense per year. The `F=` components by year are: 1985, F=R; 1986,

---

Jerry Whittlesey is general manager for Harvey Press, Inc., a commercial printing company in New Orleans.

F=R-(D/2); 1987, F=R-D; 1988, F=R-D; 1989, F=R-(D*1.5); 1990, F=R-(D*1.5); 1991, F=R-D; 1992, F=R-D; and 1993, F=R-(D/2).

230-560 Performs essentially the same function, but provides a printout. If the user does not want this feature, just change Line 230 to END.

Remember that `PRINT#-2` is the command for the Line Printer VII. It should be changed to `LPRINT` for systems using that command.

If the user is fortunate enough to be planning well ahead — or unfortunate enough to have lots of kids — the screen display capacity may be exceeded and the early years will scroll off the screen. The fix is to change Line 10 to read:

```
10 'COLLEGE EXPENSES:CLS:S=0
```

Then delete `RETURN` from Line 220 and add these two lines:

```
222 S=S+1:IF S=12 THEN 224 ELSE
RETURN
224 FOR T=1 TO 1500:NEXT
T:S=0:RETURN
```

The delay created in Line 224 may be lengthened or shortened by changing the number 1500. ☐

Sample Run

```
*************** COLLEGE EXPENSES ***************

With an initial deposit of $ 5000  at  8 % interest...
if we make an annual contribution (or deposit) of $ 1000 ,...
and the expenses per year are $ 750 ,this is the schedule:

YEAR      START     DEPOSITS       INTEREST        EXPENSES          END

1985      5,000       1,000           440                0          6,440
1986      6,440       1,000           555              375          7,620
1987      7,620       1,000           650              750          8,520
1988      8,520       1,000           722              750          9,491
1989      9,491       1,000           799            1,125         10,166
1990     10,166       1,000           853            1,125         10,894
1991     10,894       1,000           912              750         12,055
1992     12,055       1,000         1,004              750         13,310
1993     13,310       1,000         1,105              375         15,040
```

170 192
310 118
END 54

The listing: COLLEGE

```
10 'COLLEGE EXPENSES:CLS
20 PRINT:INPUT"INITIAL DEPOSIT";
A:H=A
30 PRINT:INPUT"INTEREST RATE";B:
E=B/100:'INTEREST
40 PRINT:INPUT"CONTRIBUTION PER
YEAR";C
50 PRINT:INPUT"COST PER YEAR";D
60 FA$=" ####       ###,###
###,###"
70 CLS:PRINT:PRINT" YEAR     BEG
INNING       END"
80 X=1985:'NONE IN COLLEGE
90 GOSUB 210:F=R:GOSUB 220:A=F:'
F=YEAR-END AMOUNT
100 X=1986:'ONE IN COLLEGE HALF
YEAR
110 GOSUB 210:F=R-(D/2):GOSUB 22
0:A=F
120 FOR X=1987 TO 1988:'ONE IN C
OLLEGE
130 GOSUB 210:F=R-D:GOSUB 220:A=
F:NEXT X
140 FOR X=1989 TO 1990:'TWO IN C
OLLEGE (1-1/2 EACH)
150 GOSUB 210:F=R-(D*1.5):GOSUB
220:A=F:NEXT X
160 FOR X=1991 TO 1992:'ONE IN C
OLLEGE
170 GOSUB 210:F=R-D:GOSUB 220:A=
F:NEXT X
180 X=1993:'ONE IN COLLEGE HALF
YEAR
190 GOSUB 210:F=R-(D/2):GOSUB 22
0
200 GOTO 230:'G=INTEREST
210 G=(A*E)+((C*E)/2):R=A+C+G:RE
TURN
220 PRINT USING FA$;X,A,F:RETURN
230 PRINT"":PRINT"WOULD YOU LIKE
 A PRINTOUT<Y/N>?"
240 R$=INKEY$:IF R$="" THEN 240
250 IF R$="Y" THEN GOTO 260 ELSE
 END
```

```
260 FM$="####          ###,###
##,###          ##,###          ##,#
##          ###,###"
270 PRINT#-2,"*************** CO
LLEGE EXPENSES ***************":
PRINT#-2,""
280 PRINT#-2,"With an initial de
posit of $"H" at "B"% interest..
."
290 PRINT#-2,"if we make an annu
al contribution (or deposit) of
$"C",..."
300 PRINT#-2,"and the expenses p
er year are $"D",this is the sch
edule:"
310 PRINT#-2,""
320 PRINT#-2,"YEAR          START
     DEPOSITS          INTEREST          E
XPENSES          END"
330 PRINT#-2,""
340 X=1985:'NONE IN COLLEGE
350 GOSUB 550:F=Q
360 J=0:GOSUB 560:H=F
370 X=1986:'ONE IN COLLEGE HALF
YEAR
380 GOSUB 550:F=Q-(D/2)
390 J=D/2:GOSUB 560:H=F
400 FOR X=1987 TO 1988:'ONE IN C
OLLEGE
410 GOSUB 550:F=Q-D
420 J=D:GOSUB 560:H=F:NEXT X
430 FOR X=1989 TO 1990:'TWO IN C
OLLEGE(1-1/2 EACH)
440 GOSUB 550:F=Q-(D*1.5)
450 J=D*1.5:GOSUB 560:H=F:NEXT X
460 FOR X=1991 TO 1992:'ONE IN C
OLLEGE
470 GOSUB 550:F=Q-D
480 J=D:GOSUB 560:H=F:NEXT X
490 X=1993:'ONE IN COLLEGE HALF
YEAR
500 GOSUB 550:F=Q-(D/2)
510 J=D/2:GOSUB 560
520 PRINT"":PRINT"DO ANOTHER <Y/
N>?"
530 R$=INKEY$:IF R$=""THEN 530
540 IF R$="Y" THEN GOTO 10 ELSE
END
550 G=(H*E)+((C*E)/2):Q=H+C+G:RE
TURN
560 PRINT#-2,USING FM$;X,H,C,G,J
,F:RETURN
```

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Using this handy utility makes a thrifty habit even more satisfying

Waste Not, Want Not with Refund-A-File

By Donald A. Turowski

Did you ever notice the forms hanging in your local store that say "Get $2 Back!"? Did you wonder if anybody ever bothered to take one and actually use it?

What? You mean *you* actually sent it in? And, you say you actually got $2 back?

Well, that makes you a "refunder"! Welcome to the growing world of "refunding." You're not alone, of course. Millions of people, men, women, even children, use these forms on everything from soup to nuts. Even software for personal computers!

For these people, the following program will be of great use. *Refund-A-File* is a filing-type program for the avid (and occasional) refunder. *Refund-A-File* keeps a disk file of your available refund forms so you don't have to physically sort through them to see if you have that $5 rebate on the new coffeemaker that you want to buy.

Refund-A-File will print a hard copy of your refund forms if you want. It will also add to your list, delete from your list and replace forms on your list with other forms.

Oh, there's one more option I should mention. *Refund-A-File* will also alphabetize your list. No more looking through the entire list for an item; it will be as easy as A, B, C.

Refund-A-File is menu driven for relatively easy use. It can be used to store a disk file of refund forms or can be used to store your proofs of purchase (POPS) that so many refunders keep until needed for a refund. In fact, it can also be used to make out your weekly or monthly shopping list if you simply use Option 1 and then use the printer Option 5. And, if you want to have your shopping list alphabetized, just use that option before printing.

If you do not want to type in *Refund-A-File*, send a check or money order for $9.95 to me at 1236 Ninth Avenue, Natrona Heights, PA 15065. I'll send you *Refund-A-File* so you can start

---

Donald Turowski has a bachelor's degree in education and teaches algebra and computer literacy in the Burrells School District in Natrona Heights, Pennsylvania. He is married and has two children.

using it in your refunding activities.

Briefly, here are some features and hints for *Refund-A-File*:

1) Storage available for 300-400 items.

2) As you enter items, be brief — for example, do not enter Minute Maid orange juice $1 refund but condense it to: Minute Maid OJ $1-3/31/86.

In this way, you'll save room for as many items as possible. Notice that you can include the expiration date for the refund if you want. This may reduce the number of items to 300, but should be worth it.

3) Use *Refund-A-File* to update your forms, POPS and qualifiers frequently.

4) Be sure to use the end-session option before shutting off the machine since it contains the reminder to save any changes you made in your file. The one time you do not use it probably will be the time you'll forget to save your updated file!

5) The Alphabetizing Routine will take time to complete, depending on the number of items in your list. There will be a tone to indicate when it is completed.

6) When replacing or deleting items, you must determine the *number* of the item (refer to Option 5 to view the list).

7) When printing the list on the printer, you will be asked for a title. This will appear on your printout at the top.

8) Happy refunding!

(You may contact Mr. Turowski with any questions about *Refund-A-File* at 1236 Ninth Avenue, Natrona Heights, PA 15065, phone 412-224-6529. Please include an SASE when writing.) ☐

Example 1 is a sample of the printout that is produced by the printer option of *Refund-A-File*. Example 2 is the alphabetized version of the first list.

Example 1

1	Tide $1 Refund	5/30/85
2	Ziploc Free Bread	9/30/85
3	Oreo/Hi-C	11/30/85
4	Glad $1	6/30/85
5	Prell $1.50	8/30/85
6	Axion Coupons	7/31/85
7	Biz $2	6/30/85
8	Tang Free Pitcher	6/30/85
9	Dole Pineapple	11/30/85
10	Nabisco $20	12/31/85
11	Kraft Barbeque	8/30/85
12	Kraft Cheeses	8/30/85
13	Heinz Ketchup $1	6/30/85
14	Zipwax Refund	7/30/85
15	Mr. Coffee $4	12/31/85

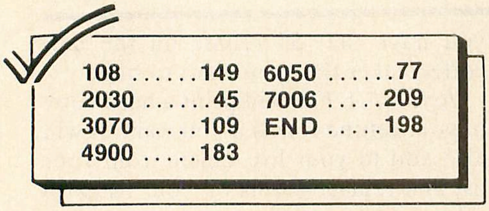
Example 2

1	Axion Coupons	7/31/85
2	Biz $2	6/30/85
3	Dole Pineapple	11/30/85
4	Glad $1	6/30/85
5	Heinz Ketchup $1	6/30/85
6	Kraft Barbeque	8/30/85
7	Kraft Cheeses	8/30/85
8	Mr. Coffee $4	12/31/85
9	Nabisco $20	12/31/85
10	Oreo/Hi-C	11/30/85
11	Prell $1.50	8/30/85
12	Tand Free Pitcher	6/30/85
13	Tide $1 Refund	5/30/85
14	Ziploc Free Bread	9/30/85
15	Zipwax Refund	7/30/85

Sample Printout

```
        CoCo Refund List

1 ADOLPHS $1 REFUND
2 AIRWICK $3 OFFER
3 ALPO $1 REFUND
4 AT&T LONG DISTANCE
5 AUNT JEMIMA FREE BUTTER
6 BAKERS CHOICE COOKBOOK
7 BIC DEAL
8 BLACK&DECKER/GE REBATES
9 BUFFERIN $2 OFFER
10 CADBURY FREE MILK
```



108	149	6050	77
2030	45	7006	209
3070	109	END	198
4900	183		

The listing: REFUND

```
2 GOTO 9000
3 CLS(RND(8)):PRINT@32*8+10,"REF
UND-A-FILE";:PRINT@32*15+1,"PROG
RAMMER:D.A.TUROWSKI, 1985 ";:FOR
 Q=1 TO 2000:NEXT Q:FOR Q=1 TO 6
0:PRINT@(RND(450)),"$";:PRINT@32
*8+10,"refund-a-file";:PRINT@32*
10+10,"disk  version";:SOUND Q+5
0,1:NEXT Q:SCREEN0,1
4 FOR Q=1TO2000:NEXT Q:CLS
5 GOSUB 10000
20 CLS
30 PRINT@32*2,"    ******select c
hoice******":PRINT
40 PRINT"(1)input forms/qualifie
rs"
50 PRINT"(2)replace forms/qualif
iers"
60 PRINT"(3)add to the list"
70 PRINT"(4)delete items from li
st"
80 PRINT"(5)print entire list"
90 PRINT"(6)save items on disk"
100 PRINT"(7)load items from dis
k"
105 PRINT"(8)alphabetize list"
107 PRINT"(9)search forms/qualif
ier list"
108 PRINT"(10)end session"
110 PRINT@32*14+10,"(1-10)";
120 INPUT M
130 IF M<0 OR M>10 THEN 20
140 ON M GOSUB 1000,2000,1020,30
00,4000,5000,6000,6500,8000,7000
150 GOTO 20
900 REM ROUTINE TO
1000 REM INPUT/ADD ITEMS
1010 Y=1
1020 CLS:PRINT"input/add items r
outine"
1030 PRINT@34,"PRESS <ENTER> WHE
N FINISHED"
1040 PRINT:PRINT "ITEM" Y;
1045 INPUT S$(Y)
1046 IF LEN(S$(Y))>25 THEN PRINT
"PLEASE RE-ENTER A SHORTER NAME"
:GOTO 1045
1050 IF S$(Y)="" THEN RETURN
```

```
1055 PRINT"ENTER EXPIRATION MONT
H":INPUT EX$(Y)
1060 Y=Y+1
1070 GOTO 1040
1900 REM ROUTINE TO
2000 REM REPLACE ITEMS
2005 N=0
2010 CLS:PRINT"replace items rou
tine"
2020 PRINT@34,"PRESS <ENTER> WHE
N FINISHED"
2030 PRINT:INPUT "ITEM NO. TO RE
PLACE";N
2040 IF N=0 THEN RETURN
2050 INPUT "REPLACEMENT ITEM";S$
(N)
2051 IF LEN(S$(N))>25 THEN PRINT
"PLEASE RE-ENTER A SHORTER NAME"
:GOTO 2050
2055 PRINT"ENTER EXPIRATION MONT
H":INPUT EX$(N)
2060 GOTO 2000
2900 REM ROUTINE TO
3000 REM DELETE ITEMS
3005 N=0
3010 CLS:PRINT"delete items rout
ine"
3020 PRINT@34,"PRESS <ENTER> WHE
N FINISHED"
3025 PRINT"NOTE-->delete from hi
ghest":PRINT"          item numbe
r to ":PRINT"      lowest item
number!"
3030 PRINT:INPUT "ITEM NUMBER TO
 DELETE";N
3035 IF N>Y-1 THEN 3030
3040 IF N=0 THEN RETURN
3050 FOR X=N TO Y-2
3060 S$(X)=S$(X+1)
3065 EX$(X)=EX$(X+1)
3070 NEXT X
3080 S$(X)="":EX$(X)=""
3090 Y=Y-1
3100 GOTO 3000
3900 REM ROUTINE TO
4000 REM  PRINT ITEMS
4001 CLS:PRINT"LIST ITEMS ON SCR
EEN(S) OR ON   PRINTER(P)?":PRIN
T"---ENTER 'S' OR 'P'";: INPUT W
$
4002 IF W$="P" THEN D=-2:T=10:PR
INT" ENTER A TITLE FOR YOUR LIST
":LINE INPUT M$:PRINT"be sure pr
inter is on line!":SOUND 200,3:P
RINT"PRESS enter WHEN PRINTER IS
       ON LINE TO BEGIN PRINTING
```

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```
!":INPUT R$:PRINT#-2,TAB(20);M$:
CLS(8)
4003 IF W$="S" THEN D=0:T=0:CLS
4010 FOR X=1 TO Y-1 STEP 15
4020 FOR Z=X TO X+14
4025 IF D=-2 THEN PRINT@32*8," p
rinting---stand by!!!!!!!!!!!":I
F S$(Z)="" THEN 4040
4030 PRINT#D,TAB(T);Z; S$(Z)
4040 NEXT Z
4050 LINE INPUT "PRESS <ENTER> T
O CONTINUE";C$
4055 IF D=-2 THEN CLS(RND(8))
4060 NEXT X
4070 RETURN
4900 REM ROUTINE TO
5000 REM SAVE ITEMS ON DISK
5010 CLS(8):PRINT@135,"save item
s on disk";
5015 SOUND 200,3:SOUND 200,3
5025 PRINT@32*8+8,"insert data d
isk";
5030 PRINT@32*10,"nEW FILE OR rE
PLACE FILE(N/R)";:INPUTQ$:IF Q$=
"N" THEN 5040 ELSE KILL"COUPONS/
DAT"
5040 PRINT@388,"PRESS <enter> WH
EN READY";
5050 LINE INPUT R$
5055 CLS(0):PRINT@224,"saving da
ta on disk---stand by!";:SOUND 2
00,3
5060 OPEN "O",#1,"COUPONS"
5070 FOR X=1 TO Y-1
5080 WRITE#1, S$(X),EX$(X)
5090 NEXT X
5100 CLOSE #1:RETURN
5900 REM ROUTINE TO
6000 REM LOAD ITEMS FROM DISK
6010 CLS(4):PRINT@134,"load data
 from disk!";:SOUND 200,3
6020 PRINT@32*8+8,"insert data d
isk!";
6040 PRINT@388,"PRESS <enter> WH
EN READY";
6050 LINE INPUT R$
6055 CLS(0):PRINT@224,"loading d
ata from disk-stand by";:SOUND 2
00,3
6060 OPEN"I",#1,"COUPONS"
6070 Y=1
6080 IF EOF(1) THEN 6120
6090 INPUT #1, S$(Y),EX$(Y)
6100 Y=Y+1
6110 GOTO 6080
6120 CLOSE #1: RETURN
6500 REM ALPHABETIZE ROUTINE
6510 CLS(RND(8)):PRINT@32*8,"sta
nd by----alphabetizing list!"
6520 FOR I=1 TO Y-1
6530 FOR J=I+1 TO Y
6535 IF S$(J)="" THEN 6580
6540 IF S$(I)<S$(J) THEN 6580
6550 T$=S$(I):F$=EX$(I)
6560 S$(I)=S$(J):EX$(I)=EX$(J)
6570 S$(J)=T$:EX$(J)=F$
6580 NEXT J,I
6590 CLS(3):PRINT@32*8,"alphabet
izing completed!!!!!!!!":SOUND 2
00,3:FORQ=1TO500:NEXTQ:RETURN
7000 CLS:FOR B=1 TO 8:CLS(RND(8)
):SOUND 200,2:NEXT B
7005 PRINT@32*3,"before ending t
his session,":PRINT"be sure to s
ave all changes":PRINT"on your d
isk file!!!":PRINT:PRINT"if you
are sure you want to":PRINT"end
the session, then press 'E'":PRI
NT"otherwise, press and <enter>
anyother";
7006 PRINT" key to return to the
 main menu"
7010 INPUT R$
7020 IF R$="E" THEN CLS:END
7030 GOTO 20
8000 CLS:PRINT"       search rout
ine":PRINT:PRINT
8010 PRINT"WHICH MONTH'S LIST DO
 YOU WANT  TO SEARCH FOR":INPUT
MM$:CLS:PRINT@10,MM$:PRINT:MM$=L
EFT$(MM$,3)
8020 FOR X=1 TO Y
8030 IF MM$=LEFT$(EX$(X),3) THEN
 PRINT S$(X)
8035 FOR Q=1 TO 100:NEXT Q
8040 NEXT X
8050 PRINT"press <enter> to cont
inue....";:LINEINPUT CR$:GOTO 20
9000 PCLEAR 1:CLEAR19000:DIM S$(
300),EX$(300):GOTO 3
10000 PRINT"THIS PROGRAM WILL KE
EP A FILE OFYOUR REFUND FORMS OR
 QUALIFIERS IN YOUR INVENTORY.":
PRINT"YOU WILL HAVE ROOM FOR ABO
UT 100-200 ENTRIES(DEPENDING ON
THEIR LENGTH)!"
10010 PRINT"THERE WILL ALSO BE A
 PRINTER    OPTION FOR YOUR LIST
 IF YOU WANT A HARD COPY FOR REF
ERENCE."
10015 PRINT"note:  DO NOT USE CO
MMAS WHEN          ENTERING ITEM
S!"
10020 PRINT@32*13+5,"PRESS enter
 TO CONTINUE";:LINE INPUT R$:CLS
:RETURN
```

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16K
ECB

Nouveau Rock 'N' Roll

By Bill Bernico

Surely everyone at one time or another has fooled around with the `SOUND` and `PLAY` commands. Maybe you've even gone so far as to compose a tune or two. OK, now what do you do with those tunes? You need a method of presenting them. Some way other than just as a musical program alone. If you run a program that simply plays a song, chances are after one or two runs, you've heard all you care to.

Bill Bernico is a self-taught computerist who enjoys golf, music and programming. He is a drummer with a rock band and lives in Sheboygan, Wisconsin.

Suppose you have five or 10 or 20 songs. How do you get folks to listen? A menu-driven selection type program is one way. (BORING!) You could present five or 10 or 20 song programs individually. (BORING!)

How about putting your songs into a program like *RADIO*? Displayed are a radio and the needed instructions. The radio has a digital readout dial and pressing the up- or down-arrow keys helps you "tune in your favorite station."

Once tuned in, press ENTER and the program randomly plays any one of a number of your favorite tunes. Line 5000 states `ZQ=RND(5):ON ZQ GOSUB 6000,7000,8000,9000,10000`. That leaves room for five of your own tunes. If you have more or less than five, change Line 5000 accordingly. Also, my lines 6000-10000 are there only as examples of how the `RANDOM` option selects a tune. Delete lines 6000-10000 and use them to store your own music.

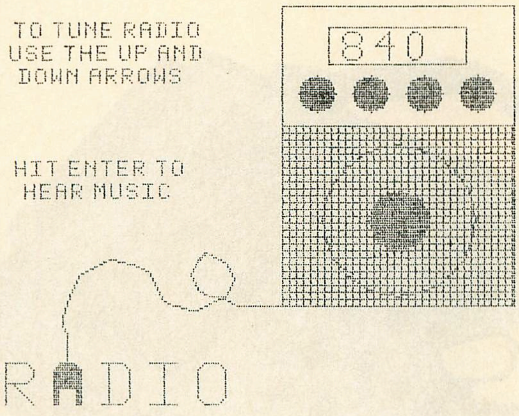
The lines where each of your own selections start should be the same as the lines mentioned in Line 5000. Don't forget to include a `RETURN` statement after your music. ☐

The listing: `RADIO`

```
300 ......215
500 .......60
END ......74
```

```
10 'RADIO
20 'BY BILL BERNICO
30 '708 MICHIGAN AVE.
40 'SHEBOYGAN, WI 53081
50 '(414) 459-7350
60 '
70 CLEAR 500
80 SP$="BR3
90 A$="BR3U5ER2FD2NL4D3
100 C$="BR3BR4BU5HL2GD4FR2EBD
```

```
110 D$="BR3RU6NLR2FD4GNL2BR
120 E$="BR3U6NR4D3NR3D3R4
130 H$="BR3U3NU3R4NU3D3
140 I$="BR3R2U6NL2NR2D6R2
150 M$="BR3U6F2DUE2D6
160 N$="BR3U6F4NU4D2
170 O$="BR3BRHU4ER2FD4GNL2BR
180 P$="BR3U6R3FDGL3D3BR4
190 R$="BR3U6R3FDGL3RF3
200 S$="BR3BUFR2EUHL2HUER2FBD5
210 T$="BR3BU6R4L2D6BR2
220 U$="BR3BUNU5FR2ENU5BD
230 W$="BR3NU6E2UDF2NU6
240 FOR G=0 TO 9
250 READ GX$(G)
260 NEXT G
270 DATA"BR3BRHU4ERFD4GNLBR2
280 DATA"BR3R2U6NGD6R2
290 DATA"BR3BU5ER2FDGL2GD2R4
```


TO TUNE RADIO
USE THE UP AND
DOWN ARROWS

840

HIT ENTER TO
HEAR MUSIC

RADIO

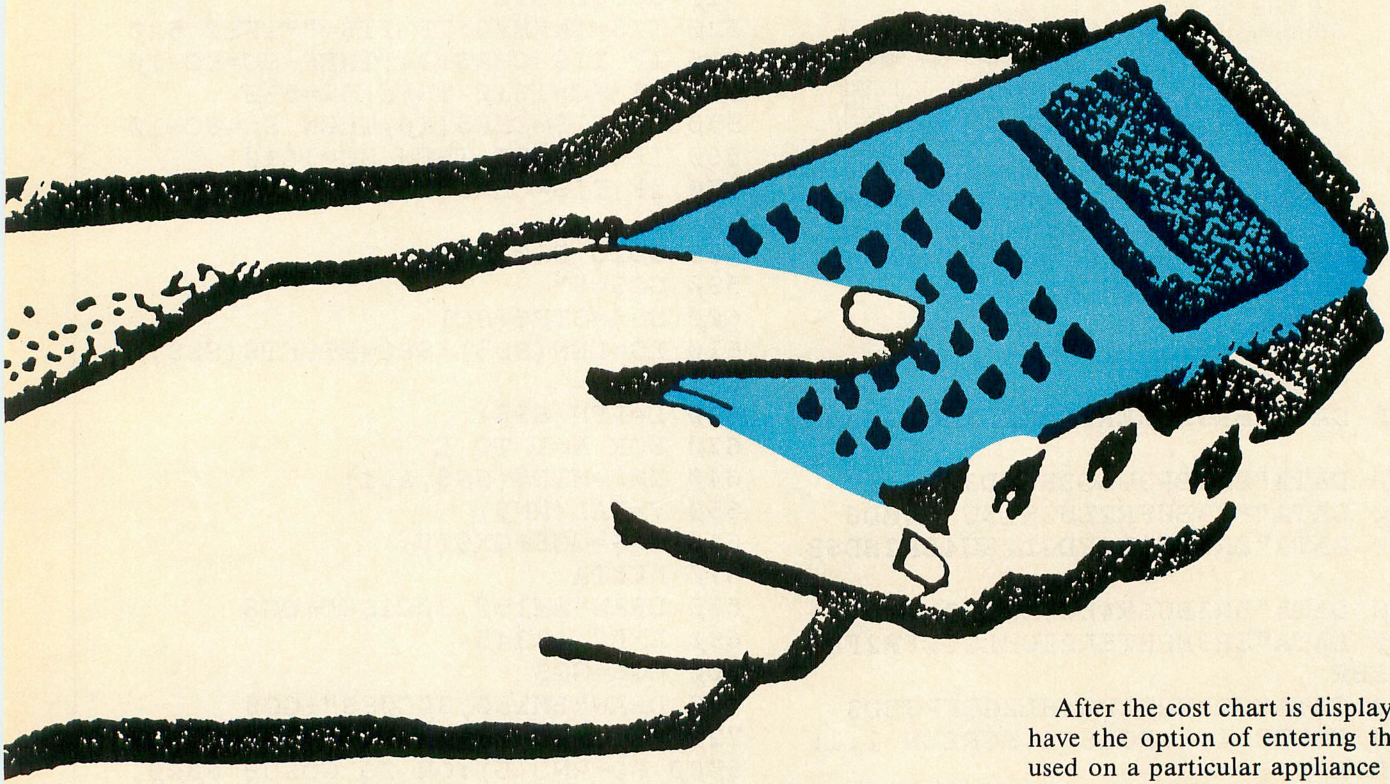
```
300 DATA"BR3BU5ER2FDGNLFDGL2NHBR
3
310 DATA"BR3BR3U6G3R4BD3
320 DATA"BR3BUFR2EU2HL3U2R4BD6
330 DATA"BR3BU3R3FDGL2HU4ER2BD6B
R
340 DATA"BR3BU6R4DG3D2BR3
350 DATA"BR3BRHUER2EUHL2GDFR2FDG
NL2BR
360 DATA"BR3BRR2EU4HL2GDFR3BD3
370 PMODE 4,1:PCLS 1:SCREEN 1,1:
COLOR 0,1
380 DRAW"BM150,32R59U16L59D16BL2
0U25D130R100U130L100
390 FOR X=145 TO 225 STEP 23:CIR
CLE(X,45),8:PAINT(X,45),0,0:NEXT
 X:CIRCLE(180,100),33
400 CIRCLE(180,100),13:PAINT(180
,100),0,0
410 DRAW"BM130,59
420 FOR X=1 TO 25:DRAW"R100D3L10
0":NEXT X
430 DRAW"BM130,59
440 FOR X=1 TO 33:DRAW"D78R3U78"
:NEXT X
450 DRAW"BM0,180S12"+R$+A$+D$+I$
+O$
460 DRAW"BM130,137S4L20HLHLHLHL5
HLHLHUHUHUHUEUEUEURURURURFRFRFRF
RFDFDFDFDGDGDGDGLGLGLGLGLGLGL4HL
2HL3HLHLHUHUHUHUHUHUHLHLHLHL3HL3
HL3GLGLGLGLGLGLGDGDGDGDGD2GD2GD2
GD5FDFD12
470 PAINT(35,165),0,0:DRAW"BM31,
170D10RU9R9DL9DR9D7LU7
480 DRAW"BM10,20S4"+T$+O$+SP$+T$
+U$+N$+E$+SP$+R$+A$+D$+I$+O$:DRA
W"BM8,30"+U$+S$+E$+SP$+T$+H$+E$+
SP$+U$+P$+SP$+A$+N$+D$:DRAW"BM12
,40"+D$+O$+W$+N$+SP$+A$+R$+R$+O$
+W$+S$
490 DRAW"BM10,80"+H$+I$+T$+SP$+E
$+N$+T$+E$+R$+SP$+T$+O$:DRAW"BM1
4,90"+H$+E$+A$+R$+SP$+M$+U$+S$+I
$+C$
500 SC=530
510 GOSUB 590
520 II$=INKEY$:IF II$=""THEN 520
530 IF II$=CHR$(94)THEN SC=SC+10
540 IF SC>1610 THEN SC=530
550 IF II$=CHR$(10)THEN SC=SC-10
560 IF SC<530 THEN SC=1610
570 IF II$=CHR$(13)THEN GOSUB 50
00
580 GOTO 510
590 GG$=""
600 SS$=STR$(SC)
610 LS=LEN(SS$):SS$=RIGHT$(SS$,L
S-1)
620 L=LEN(SS$)
630 FOR A=1 TO L
640 NN$=MID$(SS$,A,1)
650 V=VAL(NN$)
660 GG$=GG$+GX$(V)
670 NEXTA
680 DRAW"BM150,30C1S8"+OG$
690 EXEC 43345
700 OG$=GG$
710 DRAW"BM150,30C0S8"+GG$
720 RETURN
5000 ZQ=RND(5):ON ZQ GOSUB 6000,
7000,8000,9000,10000:RETURN
6000 PLAY"T10O1CDEFGABAGFEDC":RE
TURN
7000 PLAY"T10O2CDEFGABAGFEDC":RE
TURN
8000 PLAY"T10O3CDEFGABAGFEDC":RE
TURN
9000 PLAY"T10O4CDEFGABAGFEDC":RE
TURN
10000 PLAY"T10O5CDEFGABAGFEDC":R
ETURN
```

BUDGETING

16K
ECB

A Little Electrical Cost Calculator

By Dennis Anderson



Every summer I wonder how much it costs to run the air conditioner. Every winter I wonder how much spot heaters cost in electrical usage. This program, *Electrical Cost Calculator*, was written to stop my wondering.

Entering information from your electric bill allows you to break down the charges into a meaningful format. There is a display that shows the relationship between watts used and the length of time the device is on. The program is fairly straightforward. You may find the method of using `PRINT USING` interesting. The format is set up on Line 20 and is used from lines 100 to 130.

After the cost chart is displayed, you have the option of entering the watts used on a particular appliance and the time you will be using it in hours. The answer is simply displayed. You may find that knowing the cost of running a particular device will save you money. I find the cost of running my CoCo and television is remarkably low. I wish the operating costs of some other utilities were the same.

(Questions about this program may be sent to Dennis at 942-67 Street, Apt. 2A, Brooklyn, NY 11219, phone 212-680-1950. Please enclose an SASE when writing.) ☐

Dennis Anderson is a technical field service representative. He likes to unwind with his two CoCos, RAINBOW and RAINBOW ON TAPE.

120 207
END 71

The listing: ELECTRIC

```
1 '
2 ' DENNIS ANDERSON
3 ' 942-67 STREET
4 ' BROOKLYN N.Y. 11219
5 '
10 CLS:PRINT@3,"ELECTRICAL COST
CALCULATOR"
20 Y$="$#.##":Z$="$##.## "
30 PRINT:INPUT"ENTER KILOWATT US
AGE FROM BILL  ";KW
40 INPUT"MONTHLY CHARGE FROM BIL
L         (ENTER AS 24.12) ";MC
50 'CALCULATE HOURLY COST PER WA
TT
60 C=MC/KW:H=C/1000:D=H*24:WE=H*
168:MO=H*720
70 PRINT@229,"ELECTRICAL COST TA
BLE"
80 PRINT@263,"10     100     250
  500"
90 PRINT@294,"WATTS WATTS  WATTS
  WATTS"
100 PRINT@320,"HOUR ";:PRINTUSIN
G Y$;H*10;:PRINT" ";:PRINTUSING
Z$;H*100,H*250,H*500
110 PRINT@352,"DAY  ";:PRINTUSIN
G Y$;D*10;:PRINT" ";:PRINTUSING
Z$;D*100,D*250,D*500
120 PRINT@384,"WEEK ";:PRINTUSIN
G Y$;WE*10;:PRINT" ";:PRINTUSING
Z$;WE*100,WE*250,WE*500
130 PRINT@416,"MON. ";:PRINTUSIN
G Y$;MO*10;:PRINT" ";:PRINTUSING
 Z$;MO*100,MO*250,MO*500
140 :INPUT" 'D' FOR DETAIL 'E' T
O END";A$
150 IF A$="E"THEN STOP
160 CLS:PRINT:INPUT" ENTER POWER
 CONSUMPTION OF UNIT IN WATTS (V
OLTS*AMPS) ";PC
170 PRINT:INPUT" ENTER HOURS OF
OPERATION";HO
180 IC=H*(HO*PC)
190 PRINT:PRINT" YOUR COST WILL
BE ";:PRINTUSING"$$#####.##";IC
200 PRINT:
210 PRINT@448,"PRESS 'A' TO CALC
ULATE ANOTHER  ELSE PRESS 'Q' TO
 QUIT";:INPUT A$:IFA$="A"THEN GO
TO 150 ELSE IF A$="Q"THEN STOP E
LSE 210
220 '*LAST LINE*
```

CORRECTIONS

"Accessible Applications: *MAILLABL*" (November 1985, Page 247): Richard White tells us of some changes that need to be made to his program.

1) Change `DO=1` to `DO=2` in Line 110.

2) Line 205: `PRINT#-2` needs to be changed to `PRINT#DO` and `CT=CR(6)+CR(7)` needs to be changed to `CT=CT+CT(6)+CR(7)`.

"Received and Certified" (February 1986, Page 189): Due to an error in communications, the incorrect address was listed for *The Electronic Assistant Lighting Designer*. The correct address is: Theater Literate Software, The Computer Literacy Center, 3301 W. Oak Street, Kissimmee, FL 32741. We are also informed that the program comes only on cassette at the present time.

"Cross-Reference Your Programs with XREF" (February 1986, Page 169): Mr. Van Dusen advises us that a problem occurs with this program when using a printer that does not recognize `CHR$(12)` as a form feed character. You may either change the appropriate codes in lines 68 and 92 or replace those lines with:

```
68 POKELO,0:IFZZ=0THENZZ=1:GOTO6
9ELSEFORZQ=LZTO66:PRINT#-2:NEXT
92 POKELO,0:FORZQ=LZTO66:PRINT#-
2:NEXT
```

"Destination: Moon Base Amphibia" (August 1985, Page 106): Nick Bradbury has informed us that his program *will not* run with the disk controller plugged in. Also, you may contact him with questions before 9 p.m. EST at (615) 966-0172.

"Coco Bells" (December 1985, Page 36): Joseph Urbas writes to tell us that the fourth value in Line 200 controls the tempo. The article stated that it was the third value. Also, some CoCos may require the following line in the program:

```
225 POKE65315,230
```

"The Electronic Valentine Maker" (February 1986, Page 19): Brian P. Roden tells us that due to the renumbering of his program, the modification listed in his article for using the *Valprint* program (Listing 1) on printers other than a CGP-115 was incorrect.

The correct modification is:

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1 CLS
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The Makings of Memory and How it Works

By Tony DiStefano
Rainbow Contributing Editor

Remember AND, OR and XOR gates? Along with these gates came simple truth tables and Boolean expressions. All the gate examples that were given were two inputs and one output. Most of these gates also come in multiple inputs and a variety of outputs. For example, Figure 1 shows a four-input NAND and a three-input OR. If you also examine the accompanying truth tables, you will see that the rule of thumb for these gates still applies. (See my column in the February 1986 RAINBOW, Page 154, for the rules to logic gates.) Some gates are made, for instance, to have up to 13 inputs, but they are used mostly for memory mapping. I'll be going into more detail about memory mapping in a future article. No matter how many inputs you have, though, all the same rules apply.

Another property of logic gates (which have more to do with hardware than logistics) that we haven't touched on yet is the type of output. So far, all the outputs we have talked about are either ones or zeros; a one being a positive voltage (+5 volts in the case of the CoCo) and a zero being no voltage or ground. There are two other types of outputs to consider. The *open-collector* output and the *tri-state* output.

Let us look at the tri-state output first. "Tri," meaning three, tells us there are three posible output conditions. How can that be with a binary output? The word binary implies two conditions. What is the third state? The third state is called high-impedance. That is when the output is neither one nor zero. It is as if the output was not connected. The physical connection to the chip is still there (in the chip), but the internal connection is broken as if a switch was inserted.

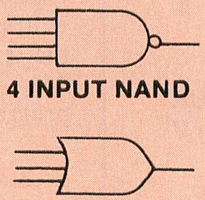

Figure 1

Examine Figure 2a. It shows an example of how a tri-state gate works. It is not practical to show a switch every time there is an output that has tri-state capabilities. Figure 2b shows us how a tri-state output is symbolized. The extra line shown is for the tri-state output control. It is an input. Depending on the chip, this input can be active high or active low. By active, I mean that the switch (Figure 2a) is closed. Active high means the switch is closed when a one is present at the tri-state control input. Active low is when a zero is present.

This type of output is needed when there are two outputs connected together. Look at Figure 2c and try to think what logic level Point B is if Point A=0 and Point C=1. This could lead to some problems. One gate wants to be five volts and the other wants to be ground. A short circuit exists and one, if not both gates, can suffer damage. A condition like this cannot exist. It is up to the system designer to make sure there is no possibility for output conflicts such as the one in Figure 2c.

However, in a computer, there are times when two outputs must meet and go into one (or more) inputs. It is then necessary to use tri-state outputs. The main use of tri-state outputs is when

---

Tony DiStefano is well-known as an early specialist in computer hardware projects. He lives in Laval Ouest, Quebec.

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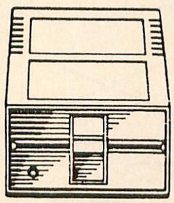

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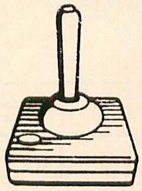

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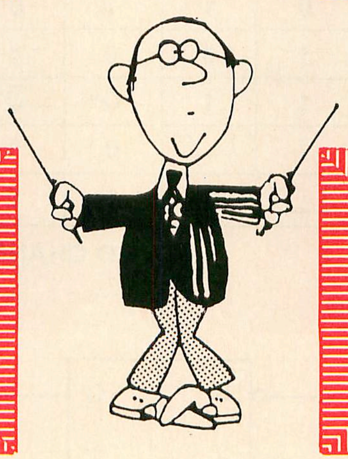

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there must exist, on a single connection, more than one output. An example of this is right on the CoCo. When you add a ROM pack or a disk drive controller to your computer, the pack and the computer share common connections, therefore both must have tri-state outputs.

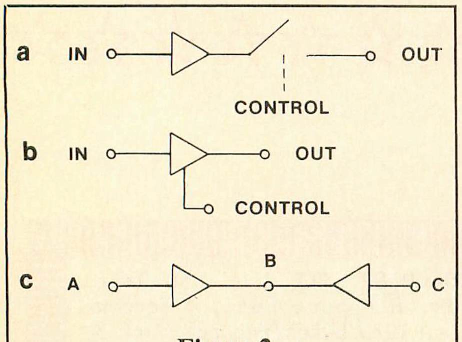


Figure 2

The second type of output is open-collector. In electronic terms, the output circuitry means that the last transistor connection to the output pin is the collector. The emitter is connected to ground and the base connects to the previous transistor. Now, to speak English. Figure 3a shows a typical open collector output. If you are not up on your electronics, and that is a bit too much to swallow, let's look at it in another way.

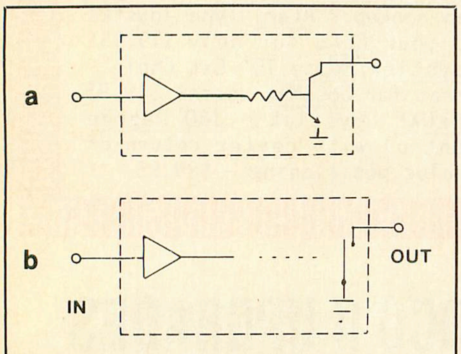


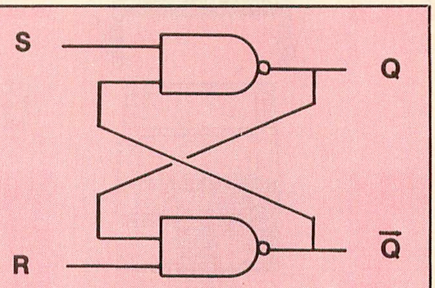
Figure 3

The output of an open collector gate can be seen as a switch with one end connected to ground. It has two states: 1) if the output is high (one), it is high impedance, not a logical one, as if it wasn't connected; 2) if the output is low (zero), it is logical zero or ground. Figure 3b shows the equivalent circuit to an open-collector output.

There is no special symbol for an open-collector gate — only the data sheet of the gate in question will tell. Usually, open-collector outputs have a resistor connected to plus voltage that gives it away. There are specific uses for this type of output. I will not go into too much detail here, but an example of this is in the disk controller. The controller uses open-collector outputs to control the disk drives.

Now it's time to move on to new material. So far, all the gates we have looked at have a given output for given inputs. If the inputs are removed, the output is no longer valid. In a computer, there is a need to remember previous events. For example, when you use a calculator to add two numbers, the first number must be remembered or stored to be used later. The ability to remember a previous event in a computer is called, yes, you guessed it, *memory*. The simplest form of memory is one bit. A one or a zero is one bit of memory. A *flip-flop* is a logic gate with memory. The simplest form of flip-flop is called the R-S (Reset, Set) flip-flop. It is made by using two gates we have already looked at.

Examine the diagram in Figure 4a. It uses two NAND gates. A NOR gate could also be used; the only difference is that the polarity required to activate the device is inversed. Given that the 'S' and 'R' inputs are both ones, the outputs 'Q' and "*Q" (the use of the symbol '*' simply means *not* or active low; it is usually shown using this symbol or as a small black bar above the character) would be one and the other zero. The outputs are always the complement of each other.

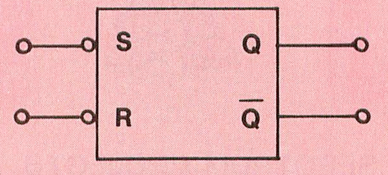


a

S	R	Q	$\overline{Q}$
0	0	1	1
0	1	1	0
1	0	0	1
1	1	Q*	$\overline{Q}$*
1	⊔	0	1
⊔	1	1	0

* NO CHANGE

b



c

Figure 4

Due to the nature of this circuit, it is impossible to tell which output is which when power is first applied. It is an *indeterminate* state. If we were to change the 'S' input to zero and then back to one, we would have what is known as a *pulse*. A pulse is a change of logic state for a predetermined amount of time, then it returns to its original state. That means if a signal is normally one, a pulse is a negative-going pulse. If the signal is normally zero, a pulse is a positive-going pulse.

This comes right in line with what is called the active state. Let's say we have a signal that is high (one) when it is idle (doing nothing) and when we want this line to do something, it goes low (zero). This is called active low. The same is true in reverse: A signal that is normally low and pulses high to activate is called active high.

To get back to our flip-flop, the result of a low pulse on the 'S' line "flips" the outputs to a known state. The 'Q' output is one and "*Q" is zero. If we were to pulse the 'R' line, the outputs "flop" to just the opposite. If both 'R' and 'S' were to be pulsed, the output is again indeterminate. The truth table for an R-S flip-flop is shown in Figure 4b. The symbol for a NAND R-S flip-flop is shown in Figure 4c.

The next diagram, Figure 5a, is called a *clocked* R-S flip-flop. This is used when it is necessary to set up the input conditions, but delay the actual setting or resetting action until a pulse is given from another source. The CK (clock) line is used to inhibit the 'S' and 'R' lines from entering the flip-flop stage. Follow the logic using the truth table in Figure 5b. Figure 5c shows the symbol for this.

To continue our quest to understanding memory, let's go one step further. If we were to add an inverter to the 'R' side of our R/S flip-flop and tie its input to the 'S' side (Figure 6), we now have a D-type flip-flop. The D-type flip-flop is one step closer to making a memory chip. The 'D' stands for data. The logical state of 'D' is transferred to the 'Q' output on the leading edge of the

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Take advantage of an expanded 64K machine. Make an additional 8K of RAM available by relocating the Ext Basic ROM from $8000 to $D800. Copy ROMPAKS to disk (even "protected" PAKS) and create a 32K SPOOL buffer for printing. DISK **$21.95** (see July '83 Rainbow Review)

TAPE/DISK UTILITY

A powerful package that transfers tape to disk and disk to tape automatically. Does an automatic copy of an entire disk of programs to tape. Ideal for Rainbow On Tape to disk. Also copies tape to tape & prints tape & disk directories. TAPE/DISK **$24.95** (see Sept '83 Rainbow Review)

SUPER DUPER UTILITIES

Finally! At last! A "SUPER DUPER" utility software package all rolled up into ONE!!! Includes such great utilities as: CoCo Disk Zap, Disk Encryption, Disk Mailing List, EZ Disk Master, Graphics ZOOM, Banner Creator, Function KEYS, Super INPUT/LINEINPUT, Basic Program PACKER, Alpha Directory, Basic SEARCH and much, much more!!! 32K DISK **$29.95**

NEW!

COCO CALENDAR

Get organized for '86 TODAY with the CoCo Calendar! Designed for recording the entire year's occassions and daily appointments so you can plan ahead. You can store HUNDREDS of entries and our GRAPHIC Calendar will show the DAYS that have all the MEMOS! 32/64K DISK **$24.95**

THE OS-9 SOLUTION

NOW, a program that creates a "USER FRIENDLY" environment within OS-9! The OS-9 SOLUTION replaces 19 of the old "USER HOSTILE" commands with single keystroke, menu driven commands. No more typing in complex long pathnames or remembering complicated syntaxes! Set all XMODE parameters at the touch of keys! Requires OS-9 ver.01.01.00 **$39.95** (see Sept '85 Rainbow Review)

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Now you can have the power to easily transfer Radio Shack Color Computer disk files to your MS-DOS machine - including the Tandy 1000 & IBM PC!!! You can also transfer MS-DOS files to your CoCo disk, even format CoCo disks! CoCo-Util will save you countless hours of retyping! No need to move your computer or printer anymore! Requires 128K MS-DOS computer w/2 disk drives - **$29.95**

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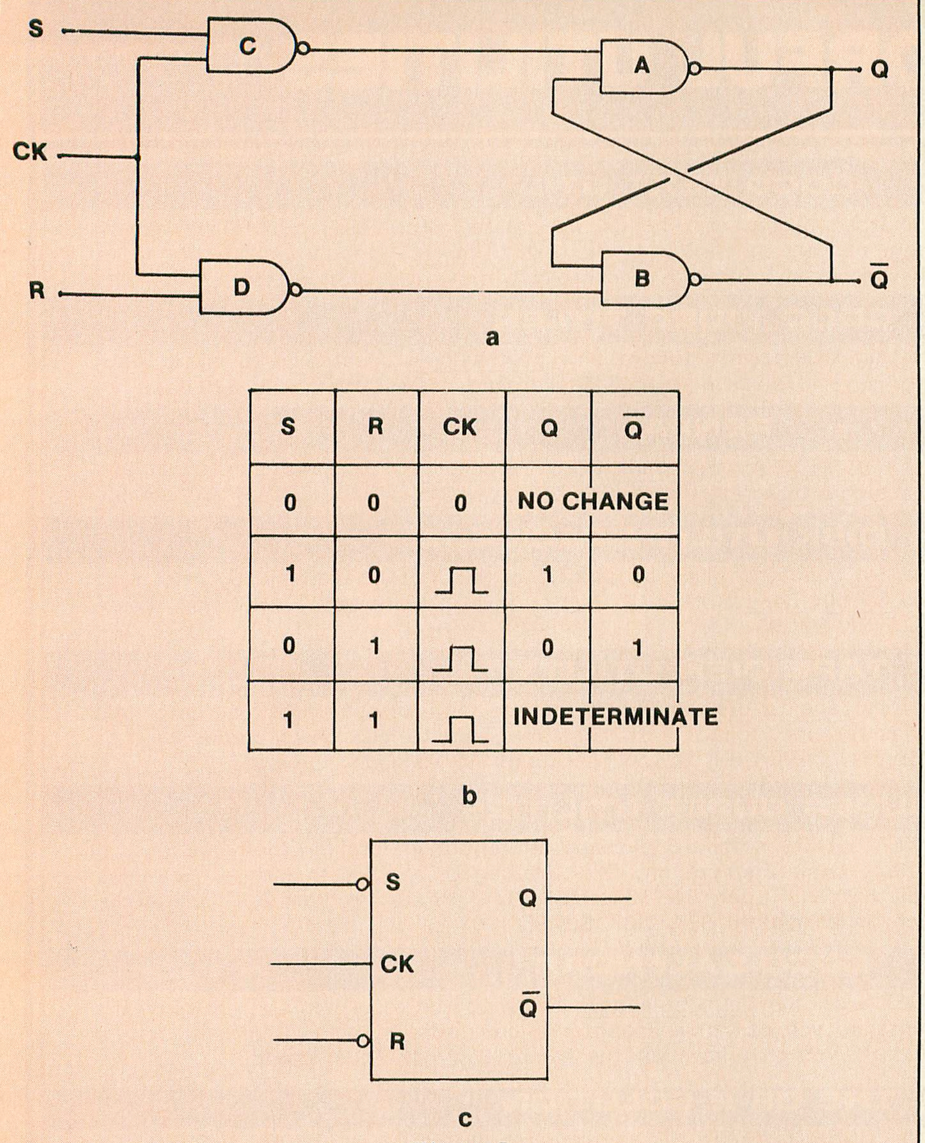


S	R	CK	Q	$\overline{Q}$
0	0	0	NO CHANGE	
1	0	⎍	1	0
0	1	⎍	0	1
1	1	⎍	INDETERMINATE	

Figure 5

clock pulse. The word "edge" in this context means the precise moment the pulse changes state. This means the instant the CK input goes high, the gate ('A' or 'B') that has the one transfers to the R/S section of the D-type flip-flop. When the CK line returns to its inactive zero state, the data is locked into the flip-flop.

You can say that this is a one-by-one memory chip. It is a far cry from the 65,536-by-eight memory capabilities of the CPU inside the CoCo. Can you imagine how big the computer would be if it had 524,280 chips in it? We will work up to that next month. In the meantime, back to the flip-flop.

There are many limitations to the simple D-type flip-flop. The main one being that since there is a single input (apart from the clock), the 'D' input must remain stable for the duration of the clock pulse. This is to ensure that the data is accurately transmitted to the output. There are many types of flip-flops. For right now, I will go into detailed explanations of only the ones that will help us understand the makings of a memory chip.

The next diagram, Figure 7a, shows a more sophisticated flip-flop. It is labeled a "positive-edge triggered D-type flip-flop" (whew, what a mouthful). This gate is one step closer to resembling the memory chips inside today's computers. The 'S' and 'R' inputs are normally one or active low. The CK line for now should be zero. When the CK goes high, the output of Gate B goes low, causing the R-S flip-flop formed by 'E' and 'F' to be set. If, while the CK is still one, the 'D' input changes, the output of Gate D changes, although this has no effect on the output since Gate C is inhibited by the output Gate B.

When CK returns low, the output of 'B' goes back to one, but 'C' is now inhibited by the zero state of the CK. The output now reflects the 'D' input. This circuit is very similar to one bit in a RAM chip. Figure 7b shows the symbol for this gate and Figure 7c shows the truth table.

The CoCo's CPU reads and writes data eight bits (one byte) at a time. This

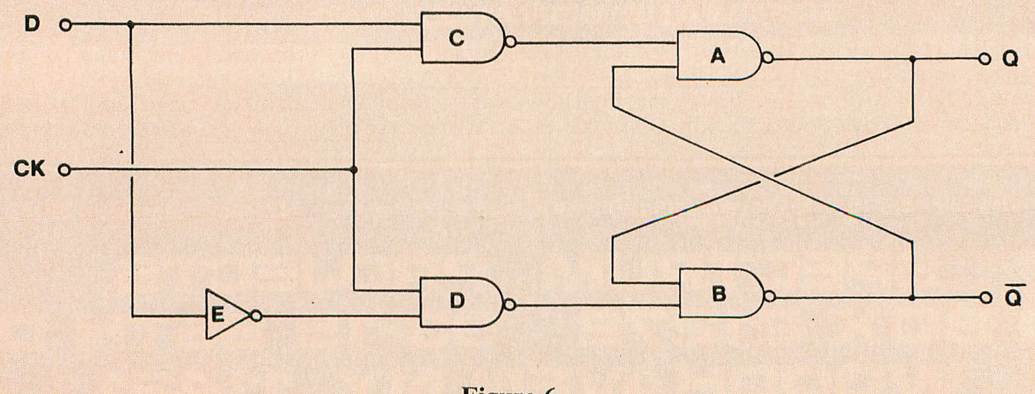


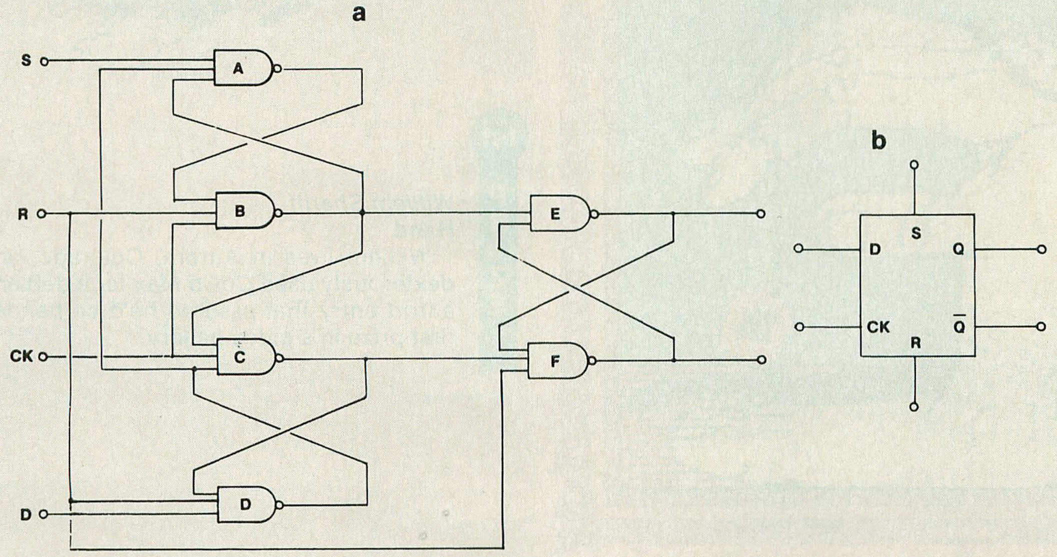
Figure 6

is not a big problem for us; all we have to do is make eight flip-flop circuits for every byte we need. There is, however, another problem we have not yet seen. This and most CPUs do not have separate input and output pins. That would make 16 pins. Instead, it has only eight pins, commonly known as the *data bus*, and one direction pin. This direction pin is known as the *read/write* line, or *R/W for short. The *R/W pin on this CPU is active low for writing. That means when this output is high, the CPU is reading or entering data (the action of transferring data from memory to the CPU). Likewise, when it is low, it is writing or producing data (the action of transferring data from the CPU to memory).

With just a few more gates, the famous positive-edge triggered D-Type flip-flop will concede to the CPU's demands. Figure 8 shows one way of making this happen. Remember the tri-state output described earlier in this article? Well, it is finally put to good use. The 'R' and 'S' lines are the same as before. In most memory circuits, they are never used. The 'Q' line, however, is tied to the input of a tri-state buffer. The *Q in this case is not used. The output of the buffer becomes the new 'D' line. This is also the input, but a new line has been added — it is the *R/W input. When this input line is high and the CK line is high, the action is a read. The tri-state Buffer A is activated, therefore the output of 'Q' appears at the 'D' line.

When the *W/R line is low and the CK line is high, the action is a write. The 'Q' output is blocked by the tri-state Gate A, but Gate B allows the 'D' input to be transferred to the R/S flip-flop and, therefore, memorized into this bit. This is the basis of how memory storage works in a computer.

Next time, we'll look at how many bits of memory form bytes and how many bytes of memory form a memory map. □



c

D	CK	Q	Q̄
0	↑	0	1
1	↑	1	0

Figure 7

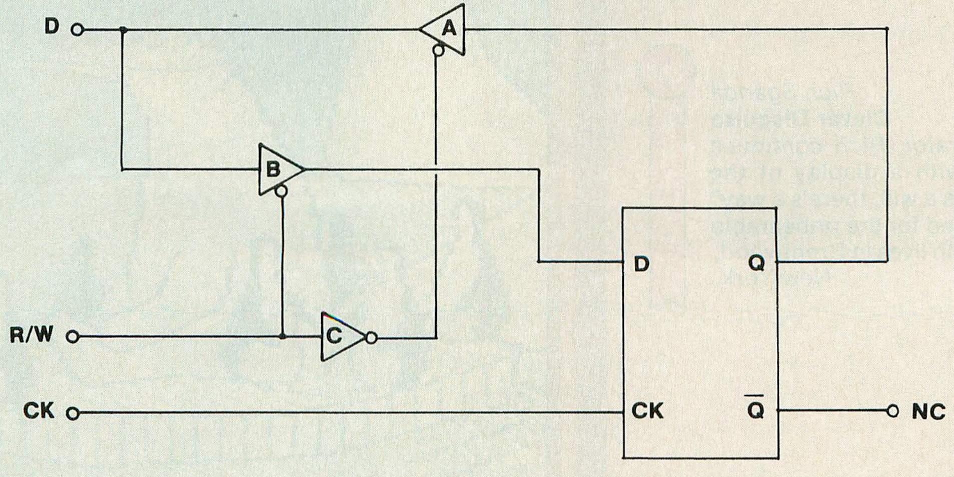
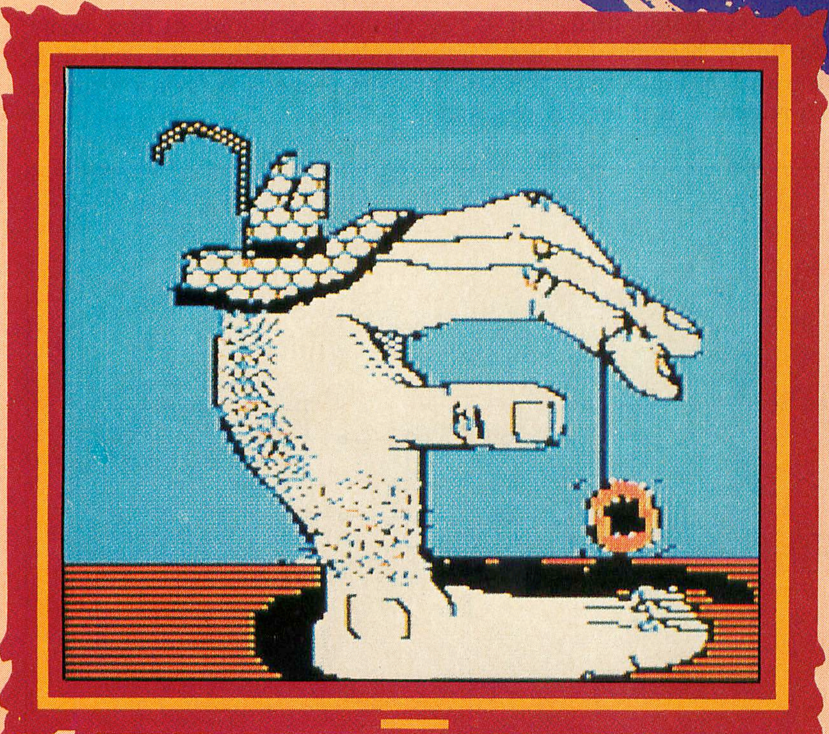

One-bit Memory Cell

Figure 8

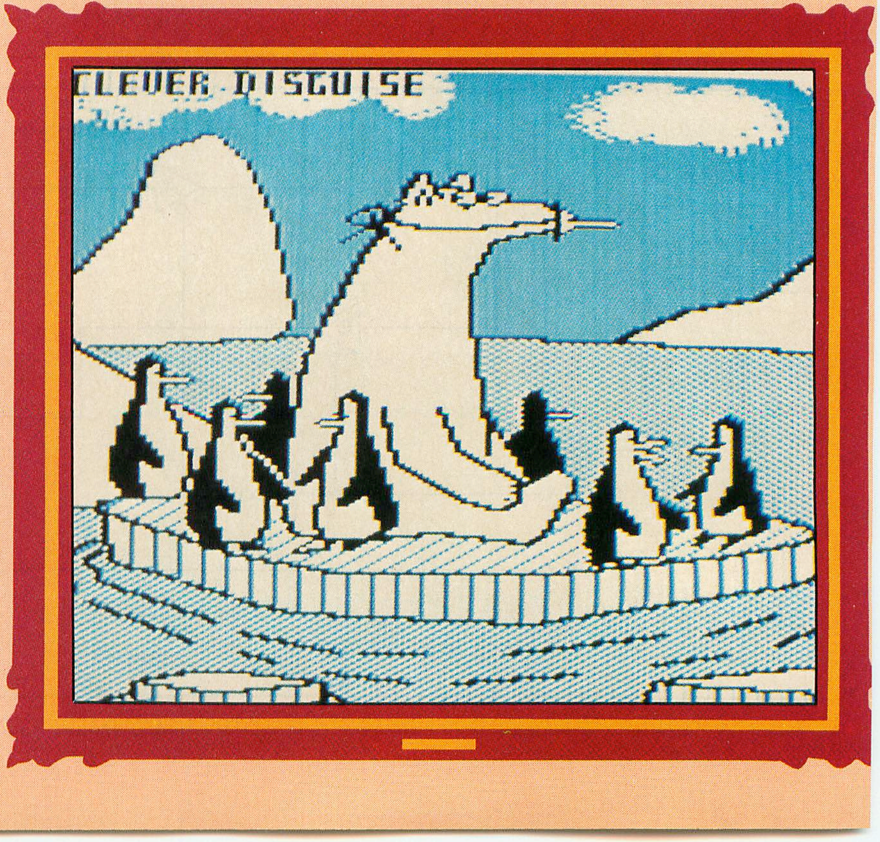
The CoCo Gallery

"April is the cruelest month," wrote T.S. Eliot, but our "CoCo Gallery" judges have taken issue with that statement, resulting in the declaration of April as the silliest month by the rest of the RAINBOW staff. With that as our opening premise, we present a lighthearted and merry "CoCo Gallery."



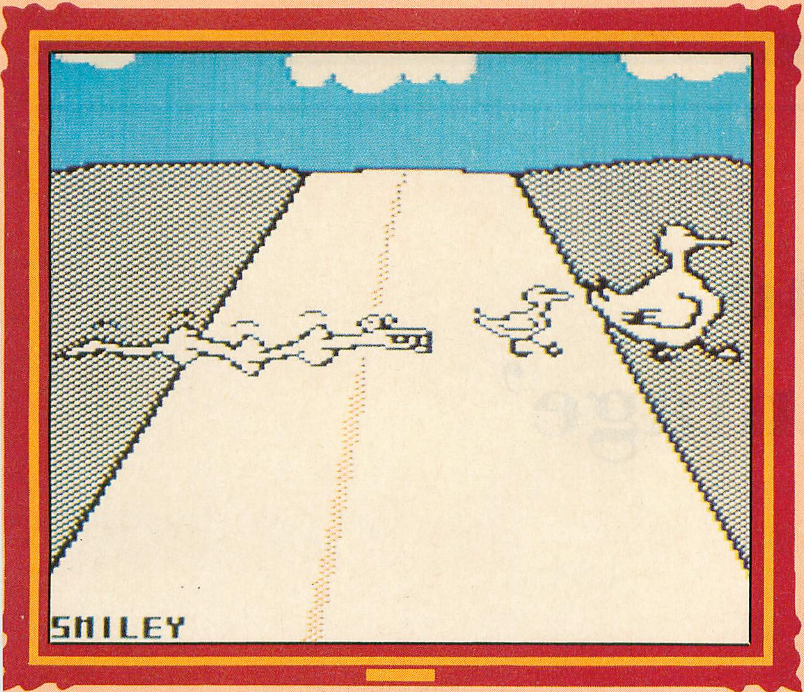
1st PRIZE

William Sheriff
Hand
William lives in Aurora, Colorado, and dexterously used *CoCo Max* for a deft and adroit entry that assured he'd be handed first prize in a giddy gallery.



2nd PRIZE

Rich Sganga
Clever Disguise
Using *Micro Illustrator*, Rich continues our gallery theme with a display of the axiom, "Where there's a will, there's a way" (if we may be pardoned for the unbearable use of that cliche). Rich lives in Brentwood, New York.



3rd PRIZE

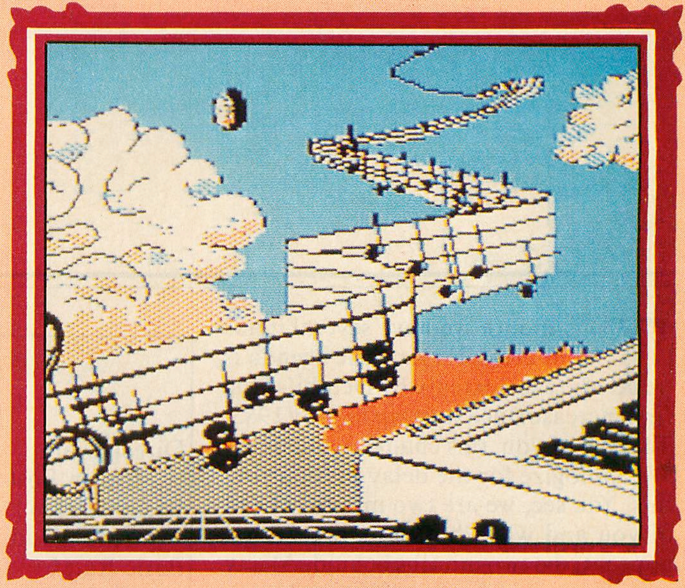
Tom Sganga
Snake

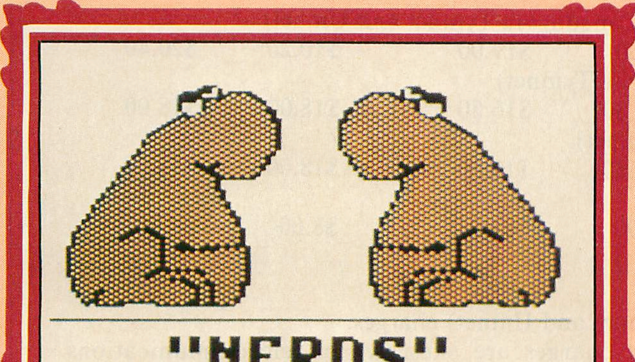
Rich's brother, Tom, also used *Micro Illustrator* for an entry he thought didn't have a leg to stand on. We agreed to put this charmer in our gallery rife with tomfoolery. (Sorry, Tom, we didn't mean that personally.)

HONORABLE MENTION

Steve Poates
New Wave

Steve lives in Mobile, Alabama, and used *Graphicom* for a windingly droll comment on the drift of some popular music currents. We rippled with delight but were threatened by parts of the staff if we dared call it "groovy."





HONORABLE MENTION

Chris Young
Nerds

He's from Fort Worth in the Lone Star State
And Chris Young we congratulate
For a brace of waggish nerds
We salute in rhyming words.
McPaint was the tool in this portrait.

SHOWCASE YOUR BEST!

You are invited to nominate original work for inclusion in upcoming showings of "CoCo Gallery." Share your creations with the CoCo Community!

Be sure to send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.) and how to display it. Also, please include a few facts about yourself.

Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere.

We will award a first prize of $25, a second prize of $15 and a third prize of $10. Honorable mentions will also be given.

Monica Dorth, Curator

Send your entry on either tape or disk to:
CoCo Gallery
THE RAINBOW
P.O. Box 385
Prospect, KY 40059
Attn: Monica Dorth

Presenting the 'Delphi Advantage'

By Cray Augsburg
Rainbow's CoCo SIGop

This month we have several items of interest. First on the agenda is the rate increase by Delphi — the first increase since start-up in May 1983. To most of you, this change is old news. We apologize for the delay in reporting this. You see, we are two months ahead of you and when hot news breaks, we appear to be two months behind. At any rate, the cost increases, effective March 3, 1986, are shown in Table 1. Look the table over carefully to see how it affects you.

	Old Rates (/hr)		New Rates (/hr)	
	Home	**Office**	**Home**	**Office**
Direct Dial (from Boston, Toronto)	$6.00	$9.60	$6.60	$9.60
Basic Rate* (Mainland U.S. and Canada, via Tymnet and Uninet)	$6.00	$16.00	$7.20	$17.40
Basic Rate* (Alaska and Hawaii, via Tymnet)	$9.00	$19.00	$10.20	$20.40
Basic Rate* (Puerto Rico, via Tymnet)	$16.80	$16.80	$18.00	$18.00
Datapac (Canada)	$16.80	$16.80	$18.00	$18.00
International** (other than Canada)	$8.00	$8.00	$8.00	$8.00

* Includes network (Tymnet and Uninet) charges.

** International connect charges are exclusive of telecommunications charges, which are billed separately.

To help offset the effect of the rate increase, Delphi has introduced the "Delphi Advantage." This is a new membership plan that assures you Delphi's lowest access rates. As a member of this plan, your rates will never exceed the standard rates of 12 months earlier. As an added attraction, Delphi will begin sending you the latest editions of Delphi handbooks and command cards at no extra charge. The cost of the Delphi Advantage package is $12, but this fee is being waived for first-time plan members who sign up before June 1, 1986.

A potential drawback to the Delphi Advantage for some users is that you must commit to using at least $24 worth of Delphi services each month. Your account will be charged for this amount even if you only spend a few minutes online in a given month. The terms of membership for the Delphi Advantage are as follows:

Eligibility

1) Delphi members using credit card billing are eligible.

2) Direct-bill customers are eligible if

Cray Augsburg serves as RAINBOW's technical assistant and holds an associate's degree in electrical engineering. He and his wife, Ruth Ann, have two children and live in Louisville, Kentucky.

the monthly fee is paid in advance.
3) A Delphi member with unused connect time credit becomes eligible once that credit is cleared from his account.

Benefits
4) Advantage plan members are assured Delphi's lowest access rates.
5) Members will receive updated handbooks and command cards.
6) Members can participate in periodic surveys concerning Delphi.

Fees
7) Entry into the Advantage plan carries a $12 fee.
8) The entry fee is waived for first-time plan members who join before June 1, 1986.
9) Members pay a monthly fee of $24 in exchange for $24 worth of connect time during either home or office time.

Applications and Billing
10) Customers may apply online at any time.
11) A Delphi Advantage membership becomes valid at 4 a.m. EST on the first billing day of the month following application approval.
12) The $24 monthly fee is billed to a customer's credit card or direct-bill account on the monthly billing day, which is posted online in "Using Delphi."

Consider these membership terms and how they apply to you.

2400 Baud at No Surcharge

In a related matter, Delphi also offers 2400 Baud telecommunications. In addition to operation at 300 Baud, there is no surcharge for 1200 and 2400 Baud service. This means no extra charge for downloading programs more quickly.

Who, What, Where and How?

There has been some confusion on the SIG as to who to send what and how. For future reference, "Letters to Rainbow," "Reviewing Reviews" and "Scoreboard" material can be sent to us through Delphi by addressing such correspondence to EDITORS. Please use MAIL rather than FORUM for this purpose. Similarly, inquiries and orders should be MAILed to ORDERS.

Online Shopping

When in THE RAINBOW's Color Computer SIG, do check out our SHOPPING service. There you can enter subscriptions to RAINBOW and order back issues of RAINBOW, binders and offerings from The Rainbow Bookshelf including RAINBOW ON TAPE.

Also, when online, do take the time to enter a profile for other SIG members to see. At the CoCo SIG prompt enter `MEMBER`, type `I-AM` and answer the questions. It's that easy. You're not done yet, however! Now, at the MAIN Delphi prompt (where you first log on), select `PEOPLE`, type `I-AM` and answer those questions, too. Then when people do a `/W USERNAME` in CONFerence, or type `/WHOIS USERNAME` at the CoCo SIG or Forum prompts, they will be able to see who you really are.

New Uploads!

A special thank you to those who really make THE RAINBOW Color Computer SIG what it is. The following people have been so kind as to upload their programs:

William Borie, DISKBANK, *DATAPAC.TXT* (Datapac XMODEM set routines).

Jim Burris, MIJ, *SQROFF* (checkers/tiddlywinks on a 3-D board).

Kevin Davidson, KDAVIDSON, *A BASIC Adventure* (a game about BASIC).

Marty Goodman, MARTYGOODMAN, *TERMREV.TXT* (review of smart terminal programs).

Eldon Griffiths, LEMANS, *EPROM Burner* (software driver).

Craig Hutchinson, CRAIGHUTCH, *Bear Down Chic Bears* (music).

Don Kline, DON13, *3-D Four in a Row* (four in a row, but now in 3-D).

Stephen Macri, DRACMAN, *ADDRESS.BAS* (address list program) and *GOBANG.BAS* (a five-in-a-row game).

Art Martin, ARTMARTIN, *MULTIZAP.BAS* (modification of *Quickzap* from December 1985 RAINBOW).

Jim Manning, JIMBM, *Budget* (a 24-category budget program) and *HOMEBUD.BAS* (a 48-category program).

John Phelps, SPCMAN, *DMAN* (menu-driven disk manager).

Dale Puckett, DALEP, *Banker Drivers* (to drive the *Banker256K*).

George Quellhorst, OLDUTCH, *THEFILE* (filing/addressing utility), *3DTICTAC.BAS* and *ONECHECK.BAS* (games, of course), *DESIRING.BIN* (a little music to take you Bach) and *CONVERT.BAS* (a six-way base conversion utility).

Eric Richards, ERICJAMES, *SKELETON.BAS* (PMODE4 skeletons).

Michael Schneider, MSCHNEIDER, *A Menu For Deft PASCAL Workbench.*

Ken Schunk, KENSCHUNK, *UNDERDOG/MAX* (mightier than *CoCo Max?*).

Douglas Trites, RUGBY, *Christmas Present Tags* (four-color tags with the CGP-115 printer).

We have also added several dozen new programs to the various topic sections of the database. ☐

Two-Liner Contest Winner . . .

This two-liner displays decimal equivalent of each ASCII character, then displays how it will look when used with a `PRINT` statement. Finally, it shows you what appears when the value is poked into a screen memory location.

The listings:

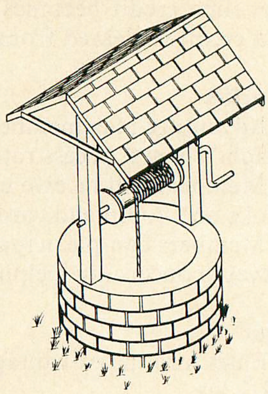
```
0 CLS:FORX=10TO19:FORY=8TO54:SET
(Y,X,5):NEXTY:FORY=13TO49STEP6:R
ESET(Y,X):RESET(Y+1,X):NEXTY,X:F
ORX=10TO14:FORY=12TO21STEP3:RESE
T(Y,X):NEXTY:FORY=30TO45STEP3:RE
SET(Y,X):NEXTY,X:PRINT@134,"2  4
     7  9  :";:PRINT@325,"1  3
5  6  8  0  -  @";
2 PLAY"L8":PLAYE$:PLAY"O2":E$=IN
KEY$:IFE$=""THEN2ELSEIFE$="0"THE
NE$="10":GOTO2ELSEIFE$=":"THENE$
="11":GOTO2ELSEIFE$="-"THENE$="1
2":GOTO2ELSEIFE$="@"THENE$="1":P
LAY"O3":GOTO2ELSE2
```

Garry L. Shelton
Kannapolis, NC

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

Continuing the "Life Skills" series . . .

Learning the Value of Numbers



By Fred B. Scerbo
Rainbow Contributing Editor

Editor's Note: If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. *Remember, keep your ideas specific, and don't forget that this is* BASIC. *All programs resulting from your wishes are for your use but remain the property of the author.*

Two months ago I said I would start a new series of programs designed to review skills that youngsters need to master for survival in the real world. The series, called "Life Skills," would alternate between real-life Simulations and skills quizzes. The first program, in the February 1986 RAINBOW, was a Simulation of subtraction skills. This month, I'm presenting the second installment in this series: *Computer Mathdrill/Number Identification.* I hope you find this offering as valuable and innovative as the first.

The Wish

Your letters and comments continue to suggest that I keep creating programs that will help your youngsters in their educational development. Granted, many of you have requested more graphics, such as a *Rockfest III* or more games. I assure you those things are in the development stage as well.

Many individuals who purchase a computer for their family often have an educational application in mind. More than once this application has proven the deciding factor between a CoCo and, say, a new washer. I need not remind you, though, that good educational software is hard to find because, quite often, a) the person writing the program is not an educator, or b) the individuals who know what they want taught don't know how to program.

Since computers mostly deal with manipulating numbers, and math programs are usually the easiest to conceptualize, too often these programs revert to a quiz of addition through division with any skill level included. Some of you may recall that my Adventure game of a few months ago, *Math Miner*, was a radical departure from this format. Many of you have indicated that you like that style, so something else new is in the works along those lines.

However, too often, skills in actual number or digit analysis are lacking when it comes to computer programs. Before a student can effectively move on to a skill like rounding off decimals, the student must be able to determine what the value of the digit in the tenths place or where the hundredths place is.

Many students have difficulty reviewing this skill since it must usually be done with pencil and paper or with the guidance of an instructor. This is not always practical in a classrom with a high pupil-to-teacher ratio.

Therefore, our wish to be granted this month will be to develop a program that helps a youngster analyze the place value of numbers and digits. The result is our second "Life Skills" program on number evaluation.

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

The Program

Be sure to take great care in typing in the `DATA` statements at the beginning of the program; be sure to include every string of commas you see. You may recall that last month's program, *Title Maker*, was used to create the `DATA` for this screen. Please refer back to that article for an explanation of why the blank commas are used.

On running the program, the "Life Skills" title appears. You are asked to select a skill level from one to four (1-4). Level one creates a four-digit number with one decimal place; level two creates a six-digit number with two decimal places; level three creates an eight-digit number with three decimal places; finally, level four creates a 10-digit number with four decimal places. This allows the user or the instructor to set a level of difficulty that matches the level being covered in the classroom.

Upon selecting the level, the screen clears and displays (if, for example, you are on level one):

```
YOUR NUMBER     324.5
```

Directly under the number is an arrow pointing to one of the places in the number. Before selecting the place, the arrow dances around the bottom of the number so as to appear to heighten the random nature of its selection. Next, a selection of letters and corresponding places are displayed. In this case, it will be:

```
(D) HUNDREDS
(E) TENS
(F) ONES
(G) TENTHS
```

The reason the selections start with (D) and not (A) is because the most difficult level (four) starts with the hundred-thousandths place, which would be displayed at that level starting with the letter (A).

The program has been written so only the applicable categories are displayed at any given time.

The screen next displays:

```
WHICH PLACE IS THE ARROW
POINTING TO ?
```

In the case of level one, only the keys D through G respond. If you press any key other than the '@' key, the program does not respond. The '@' key is used to check your score or end the program.

If your answer is correct, the screen responds appropriately and indicates the correct letter choice as well. If the answer is wrong, the screen flashes and

Metric Industries

Model 101 Interface $39.95

The Model 101 is a serial to parallel interface intended for use with a COCO and any Centronics compatible parallel input printer. The 101 has 6 switch selectable baud rates (300-9600). The 101 is only 4″ × 2″ × 1″ and comes with all cables and connectors for your computer and printer.

The Model 104 Deluxe Interface $51.95

The Model 104 is a serial to parallel interface like the Model 101 but it has the added feature of a serial port (sometimes referred to as a modem switch). This feature allows the connection of a parallel printer and any serial device (modem, serial printer etc.) to your computer. You may then select either output, serial or parallel, with the flip of a switch. The 104 is only 4.5″ × 2.5″ × 1.25″ and comes with all cables and connectors for your computer. You supply the serial cable for your modem or other serial device.

Model 103 Combo $68.95

With the turn of a knob the model 103 switches your computer's RS232C serial port to any one of 3 outputs — 2 serial and 1 parallel. The serial ports may be used for modems, serial printers or even another computer. The parallel port can be used with any Centronics compatible printer. The 103 has the best features from the 101 and 102: color coded position indicator lights, 6 switch selectable baud rates, heavy anodized aluminum cabinet, and many more.

Model 102 Switcher $35.95

The Model 102 has 3 switch positions that allow you to switch your computer's serial output between 3 different devices (modem, printers or another computer). The 102 has color coded lights that indicate the switch position. These lights also act as power indicators to let you know your computer is on. Supplied with the 102 are color coded labels that can be applied to your accessories. The 102 has a heavy guage anodized aluminum cabinet with non-slip rubber feet.

Cassette Label Program $6.95

New Version 1.2-Tape transferable to disk. Now save and load Labels from tape or disk.

This fancy printing utility prints 5 lines of information on pinfeed cassette labels. "Cassette Label" is menu driven and is very easy to use. It uses the special features of your printer for standard, expanded or condensed characters. Each line of text is automatically centered. Before the label is printed, it is shown on your CRT — enabling you to make changes if you like — then print 1, 2 or 100 labels. The program comes on tape and it is supplied with 24 labels to get you started. 16K ECB required.

Other Quality Items

High Quality 5 Screw Shell C-10 Cassette Tapes **$7.50 per dozen**

Hard Plastic Storage Boxes for Cassette Tapes **$2.50 per dozen**

Pin Feed Cassette Labels
White **$3.00 per 100**
Colors **$3.60 per 100** (Red, Blue, Yellow or Tan)

VISA MasterCard

THE 101, 103 AND 104 ALL REQUIRE POWER IN ORDER TO OPERATE. MOST PRINTERS CAN SUPPLY POWER TO YOUR INTERFACE. STAR, RADIO SHACK, AND OKIDATA ARE JUST A FEW THAT DO. EPSON DOES NOT. THE INTERFACES CAN ALSO BE POWERED BY AN AC ADAPTER (RADIO SHACK MODEL 273-1431 PLUGS INTO ALL MODELS). IF YOU REQUIRE A POWER SUPPLY, ADD A "P" TO THE MODEL NUMBER AND $5.00 TO THE PRICE. (MODEL 101P $44.95, MODEL 104P $56.95 AND MODEL 103P $73.95)

The Model 101, 102, 103 and 104 will work with any COCO, any level basic and any memory size. These products are covered by a **1 year warranty.**

The Model 101, 103 and 104 work with any standard parallel input printer including Gemini, Epson, Radio Shack, Okidata, C. Ioth and many others. They support BASIC print commands, word processors and graphic commands.

We manufacture these products. Dealer inquiries are invited.

To order call our 24 hour order line 513-677-0796 and use your VISA MASTERCARD request C.O.D. or send check or money order to:

Metric Industries
P.O. Box 42396
Cincinnati, OH 45242

Free shipping on orders over $50.00. Ohio residents add 5.5% sales tax.
Orders under $50.00 please add $2.50 for shipping.

a sound indicates the choice is not correct. The user must continue until the correct answer is entered. After all the places in the number have been covered, the second half of the quiz format is activated.

The screen next prints:
WHAT IS THE DIGIT AT PLACE F?
or one of the other letter answers. Now the user must identify the number that appears in, say, the tens place, and press the number key (0-9) as it appears at the top of the keyboard. The correct and incorrect answer responses are the same as in the first half.

Therefore, as you can see, this drill helps quiz and reinforce both the skills of identifying the place value in a digit and the correct title of each place. The quiz can be stopped at any time by pressing '@' to check the score. Pressing 'C' from the score card allows the user to continue taking the drill after checking the score, although a new number is generated if this continue function is used in the middle of a generated number.

MC-10 Changes

To keep those who still have MC-10 computers happy, you must make the following changes to make this program work on your 20K machine. Change the `REM` statement in Line 50 from:

```
50 REM IF MC-10 THEN MC=15360
```
to
```
50 MC=15360
```

In Line 130, you must change the value of (-TIMER) to (9999), since MC-10 has no timer. Also, in lines 370 and 455, you must delete the commands that read:

```
PMODE4,1:SCREEN0,1
```
and
```
SCREEN0,0
```

since these are graphics commands that only work in Extended Color BASIC. The rest of the program should work as listed. All remaining instructions are the same.

Conclusion

I have been using an earlier version of this drill for some time now. It has proven to be very valuable in developing and reinforcing math skills. I hope you find it equally useful as you add it to your collection of educational and "Life Skills" programs, which can only be found in THE RAINBOW. ☐

95	151
185	238
265	233
360	68
440	18
END	31

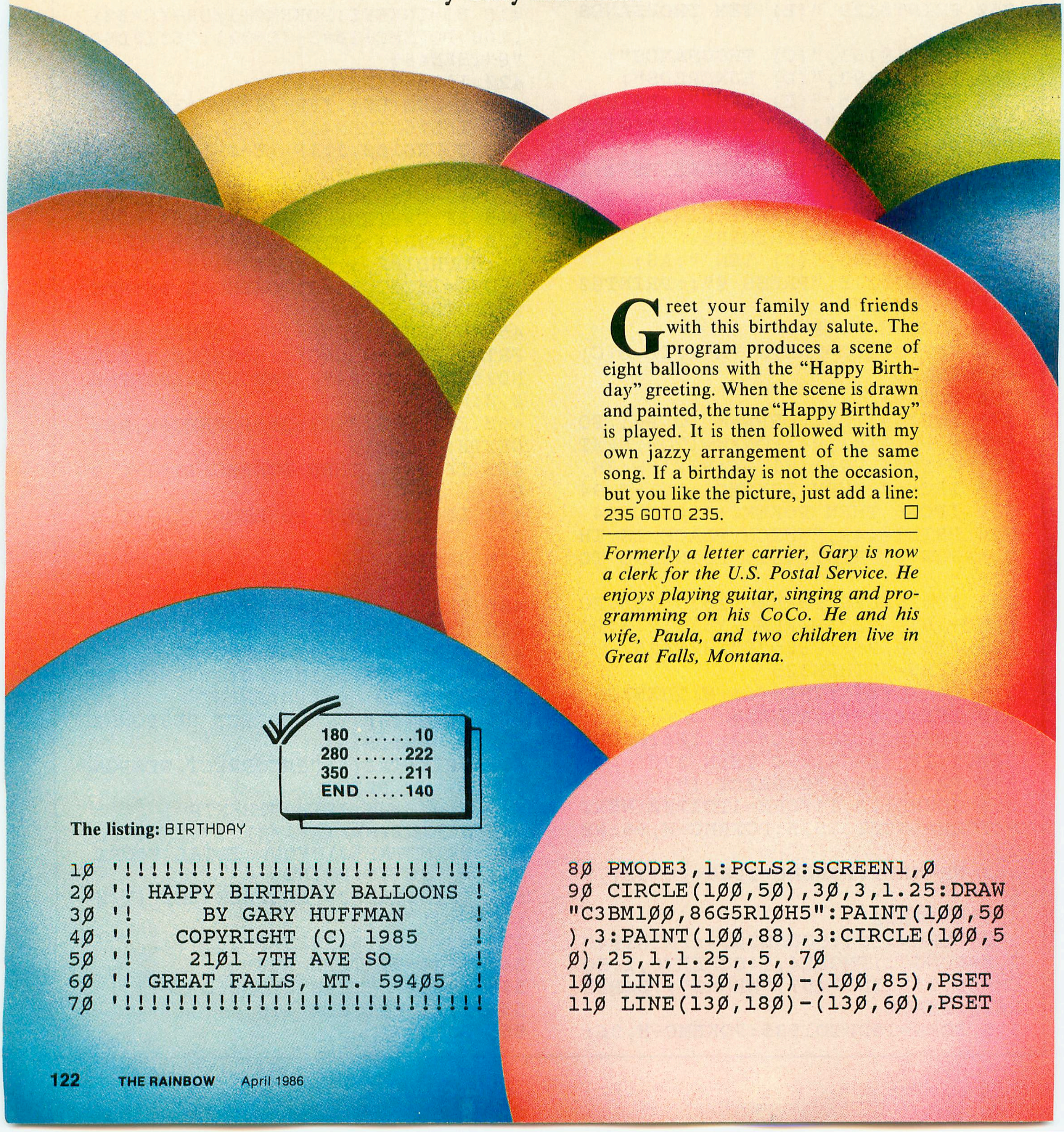
The listing: `LIFESKL2`

```
10 REM***************************
15 REM* LIFE SKILLS MATH DRILL *
20 REM*     NUMBER EVALUATION   *
25 REM*     BY FRED B.SCERBO    *
30 REM*       60 HARDING AVE    *
35 REM*   NORTH ADAMS,MA 01247  *
40 REM*    COPYRIGHT (C) 1986   *
45 REM***************************
50 REM IF MC-10 THEN MC=15360
55 CLS0:FORI=1TO32:PRINTCHR$(156
);:NEXT
60 FORI=1TO192:READA:IFA=0THENA=
16
65 PRINTCHR$(A+112);:NEXT
70 FORI=1TO32:PRINTCHR$(147);:NE
XT
75 DATA109,104,96,109,104,100,11
0,108,106,109,108,109,,,30,28,26
,29,,,30,20,30,20,30,16,20,30,,2
1,28,29
80 DATA101,,,101,,,106,96,104,10
1,,100,,,26,,24,21,16,22,16,,26,
,26,,16,26,,21,,20
85 DATA101,,,101,,,107,106,96,10
1,99,98,,,27,19,18,21,22,16,,,26
,,26,,16,26,,21,19,19
90 DATA101,,,101,,,106,104,,101,
,,,,,,26,21,20,18,,,26,,26,,16,2
6,,,,21
95 DATA101,,106,101,,,106,,,101,
,97,,16,26,,26,21,,20,18,,26,,26
,21,16,26,21,21,,21
100 DATA103,99,106,103,98,97,107
,,,103,99,103,,,27,19,26,23,18,,
27,17,27,17,27,23,17,27,23,21,19
,23
105 PRINT@293,"  COMPUTER MATHDR
ILL  ";
110 PRINT@325,"  NUMBER  EVALUAT
ION  ";
115 PRINT@357,"   BY FRED B.SCER
BO   ";
120 PRINT@389,"  COPYRIGHT (C) 1
986  ";
125 PRINT@453,"  SKILL LEVEL  (1
-4)  ";
130 X$=INKEY$:MU=RND(-TIMER):IFX
$=""THEN130
135 RR=VAL(X$):IFRR<1THEN130
140 IF RR>4THEN130
145 ON RR GOTO150,155,160,165
150 M=4:P=7:Y=3:GOTO170
155 M=3:P=8:Y=2:GOTO170
160 M=2:P=9:Y=1:GOTO170
165 M=1:P=10:Y=0:GOTO170
170 REM START PROGRAM
175 K=0:CLS:FORI=1TO10:B(I)=0:NE
XTI
180 FORI=1TO10:A(I)=0:NEXTI:FORI
=M TO P
185 A(I)=RND(11)-1:IF A(I)=0THEN
185
190 NEXTI:IF Y=0THEN A(1)=RND(10
)
195 CLS:PRINT@33,"YOUR NUMBER";
200 FORI=1TO6:IF A(I)=0 THEN POK
EMC+1069+I,96
205 IF A(I)<>0 THEN POKEMC+ 1069
```

```
+I,111+A(I)
210 NEXTI:POKEMC+1076,110:FORI=7
TO10:IF A(I)=0 THEN POKEMC+ 1070
+I,96
215 IF A(I)<>0 THEN POKEMC+ 1070
+I,111+A(I)
220 NEXTI
225 FORI=1TO10:A(I)=A(I)-1:NEXTI
230 IFY=3THEN260
235 IF Y=2THEN255
240 IF Y=1THEN250
245 PRINT@97,"(A) HUNDRED THOUSA
NDS";
250 PRINT@129,"(B) TEN THOUSANDS
";
255 PRINT@161,"(C) THOUSANDS";
260 PRINT@193,"(D) HUNDREDS";
265 PRINT@225,"(E) TENS";:PRINT@
257,"(F) ONES";:PRINT@289,"(G) T
ENTHS";:IFY=3THEN285
270 PRINT@321,"(H) HUNDRETHS";:I
F Y=2THEN285
275 A$="THOUSANDTHS":PRINT@353,"
(I) ";A$;:IF Y=1THEN285
280 PRINT@385,"(J) TEN ";A$;
285 PRINT@215,"PRESS @";:PRINT@2
47,"TO END."
290 FORQ=M TO P
295 J=P-M+1:C=RND(J)+M-1:IF B(C)
=1THEN295
300 B(C)=1
305 FORJW=1TO5:FORPW=M TO P+1:PO
KEMC+ PW+1101,94:FORKW=1TO9:NEXT
KW:POKEMC+ PW+1101,96:NEXTPW,JW
310 IFC<=6 THEN POKEMC+1101+C,94
315 IFC>6 THEN POKEMC+1102+C,94
320 PRINT@449,"WHICH PLACE IS TH
E ARROW";:PRINT@481,"POINTING TO
 ?";
325 B$=INKEY$:POKEMC+1519,255:PO
KEMC+1519,223:POKEMC+1519,175:PO
KEMC+1519,96:IFB$="@"THEN485
330 IFB$=""THEN325
335 E=ASC(B$):IFE<(64+M)THEN325
340 IFE>(76-Y)THEN325
345 POKEMC+1088+(C*32),106:SOUND
200,1:IF (E-64)<>C THEN 370
350 PRINT@497,"CORRECT !";
355 SOUND100,1:FORH=1TO1700:NEXT
H:FORH=1520TO1535:POKEMC+H,96:NE
XTH
360 NR=NR+1:POKEMC+1088+(C*32),9
6
365 GOTO380
370 FORH=1TO4:SOUND50,9:PRINT@49
7,"WRONG";:PMODE4,1:SCREEN0,1:SO
UND25,9:PRINT@497,"WRONG";:SCREE
N0,0:NEXTH
375 FORH=1520TO1535:POKEMC+H,96:
NEXTH:NW=NW+1:POKEMC+1088+(C*32)
,96:GOTO325
380 IFC<=6 THEN POKEMC+1101+C,96
385 IFC>6 THEN POKEMC+1102+C,96
390 NEXTQ
395 FORI=1472TO1535:POKEMC+I,96:
NEXT:FORQ=M TO P
400 J=P-M+1:C=RND(J)+M-1:IF B(C)
=0THEN400
405 B(C)=0
410 PRINT@449,"WHAT IS THE DIGIT
 AT PLACE";:PRINT@476,CHR$(C+64)
;" ?"
415 B$=INKEY$:POKEMC+1088+(C*32)
,106:POKEMC+1088+(C*32),96:IFB$=
"@"THEN485
420 IFB$=""THEN415
425 E=ASC(B$):IFE<48THEN415
430 IFE>57THEN415
435 SOUND100,1:IF (E-48)<>A(C) T
HEN 455
440 IF C<=6THENPOKEMC+1101+C,94
445 IF C>6THEN POKEMC+ 1102+C,94
450 NR=NR+1:PRINT@497,"CORRECT !
";:SOUND100,1:FORG=1TO1700:NEXTG
:FORG=1520TO1535:POKEMC+G,96:NEX
TG:GOTO465
455 NW=NW+1:FORH=1TO4:SOUND50,9:
PRINT@497,"WRONG";:SCREEN0,1:SOU
ND25,9:PRINT@497,"WRONG";:SCREEN
0,0:NEXTH
460 FORH=1520TO1535:POKEMC+H,96:
NEXTH:GOTO415
465 IF C<=6 THEN POKEMC+1101+C,9
6
470 IF C>6 THEN POKEMC+ 1102+C,9
6
475 NEXTQ
480 GOTO175
485 REM SCORE CARD
490 REM NW=WRONG:NR=RIGHT
495 CLS:PRINT:PRINT:PRINT
500 PD=NR+NW:PRINTTAB(3)"PROBLEM
S COMPLETED  = "PD:PRINT
505 PRINTTAB(3)"CORRECT RESPONSE
S   = "NR:PRINT
510 PRINTTAB(3)"INCORRECT RESPON
SES = "NW:PRINT
515 TR=NR+NW:IFTR=0THENTR=1
520 SC=INT(NR/TR*100)
525 PRINTTAB(3)"YOUR TOTAL SCORE
    = "SC"%":PRINT
530 PRINTTAB(3)"ANOTHER TRY (Y/N
) OR (C) ?";
535 X$=INKEY$:IFX$=""THEN535
540 IFX$="Y"THEN RUN
545 IFX$="N"THEN CLS:END
550 IFX$="C"THEN 175
555 GOTO535
```

Happy Birthday Balloons

By Gary Huffman



Greet your family and friends with this birthday salute. The program produces a scene of eight balloons with the "Happy Birthday" greeting. When the scene is drawn and painted, the tune "Happy Birthday" is played. It is then followed with my own jazzy arrangement of the same song. If a birthday is not the occasion, but you like the picture, just add a line: `235 GOTO 235`. ☐

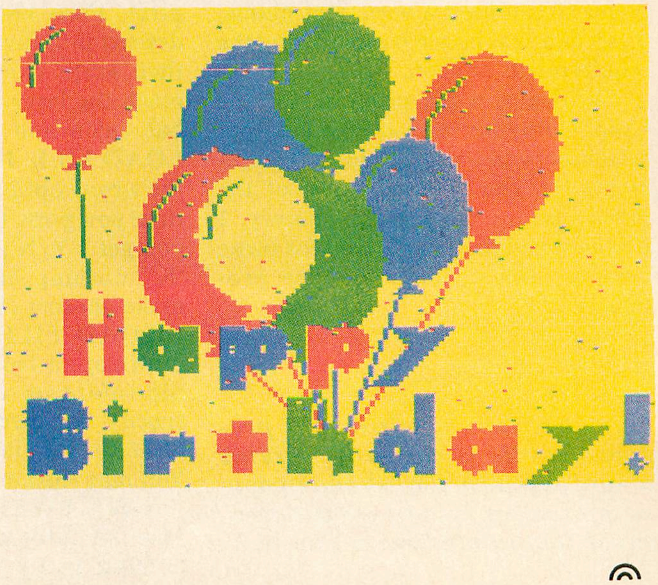
Formerly a letter carrier, Gary is now a clerk for the U.S. Postal Service. He enjoys playing guitar, singing and programming on his CoCo. He and his wife, Paula, and two children live in Great Falls, Montana.

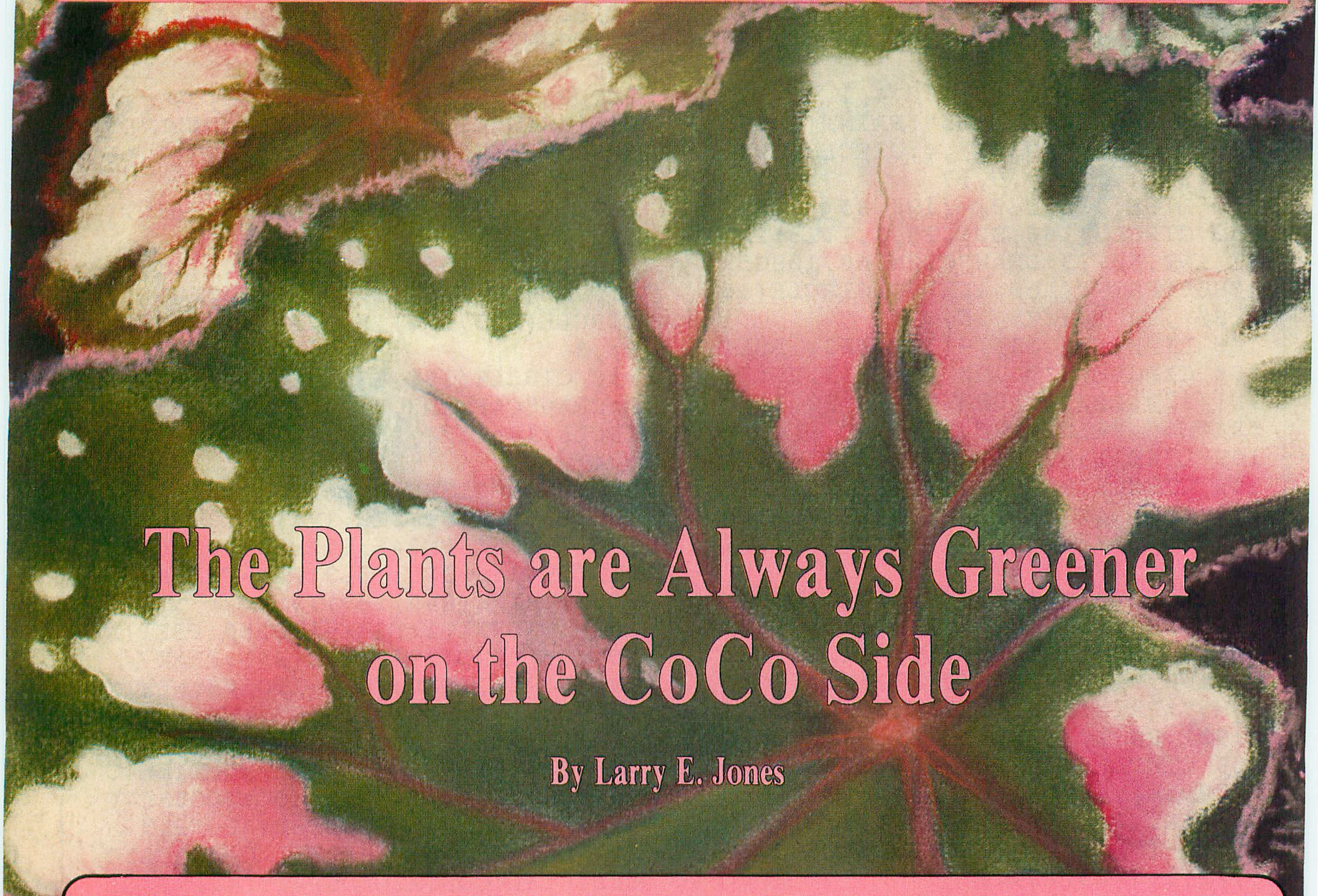
180 10
280 222
350 211
END 140

The listing: BIRTHDAY

```
10 '!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
20 '! HAPPY BIRTHDAY BALLOONS !
30 '!      BY GARY HUFFMAN       !
40 '!    COPYRIGHT (C) 1985      !
50 '!      2101 7TH AVE SO       !
60 '! GREAT FALLS, MT. 59405    !
70 '!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
80 PMODE3,1:PCLS2:SCREEN1,0
90 CIRCLE(100,50),30,3,1.25:DRAW
"C3BM100,86G5R10H5":PAINT(100,50
),3:PAINT(100,88),3:CIRCLE(100,5
0),25,1,1.25,.5,.70
100 LINE(130,180)-(100,85),PSET
110 LINE(130,180)-(130,60),PSET
```

```
120 CIRCLE(130,30),25,1,1.25:PAI
NT(150,40),1:DRAW"C1BM130,58G5R1
0H5":PAINT(130,61),1:CIRCLE(130,
30),20,3,1.25,.5,.7
130 CIRCLE(190,55),30,4,1.25:DRA
W"C4BM190,90G5R10H5":PAINT(190,5
5),4:PAINT(190,93),4:CIRCLE(190,
55),25,1,1.25,.5,.7
140 LINE(130,180)-(190,85),PSET
150 CIRCLE(160,80),25,3,1.25:PAI
NT(160,80),3:DRAW"C3BM160,108G5R
10H5":PAINT(160,111),3:CIRCLE(16
0,80),20,1,1.25,.5,.7
160 LINE(130,180)-(160,103),PSET
170 CIRCLE(120,100),30,1,1.25:PA
INT(120,100),1:DRAW"C1BM120,135G
5R10H5":PAINT(120,138),1
180 LINE(130,180)-(120,132),PSET
190 CIRCLE(85,95),33,4,1.25:PAIN
T(85,95),4:DRAW"C4BM85,133G5R10H
5":PAINT(85,136),4:CIRCLE(85,95)
,28,1,1.25,.5,.7
200 LINE(130,180)-(85,130),PSET
210 LINE(130,180)-(100,115),PSET
220 CIRCLE(100,90),25,2,1.25:PAI
NT(100,90),2:DRAW"C2BM100,118G5R
10H5":PAINT(100,121),2:CIRCLE(10
0,90),20,1,1.25,.5,.7
230 CIRCLE(30,30),25,4,1.25:PAIN
T(30,30),4:DRAW"C4BM30,58G5R10H5
":PAINT(30,61),4:COLOR1,2:LINE(3
0,60)-(35,110),PSET:CIRCLE(30,30
),20,1,1.25,.5,.7
240 DRAW"C4BM25,115D30R7U15R8D15
R7U30L7D10L8U10L7":PAINT(30,125)
,4
250 CIRCLE(62,135),10,1,1,.15,.9
:DRAW"C1BM70,130U4R7D18L7U4":CIR
CLE(62,135),5,1:PAINT(68,135),1
260 DRAW"C3BM87,130U4R7D4U4L7D25
R7U10":CIRCLE(102,135),10,3,1,.6
5,.36:CIRCLE(102,135),5,3:PAINT(
94,135),3
270 DRAW"C4BM120,130U4R7D4U4L7D2
5R7U10":CIRCLE(135,135),10,4,1,.
65,.36:CIRCLE(135,135),5,4:PAINT
(127,135),4
280 DRAW"C3BM152,127F8G15R9E23L9
G3H3L9":PAINT(159,130),3
290 DRAW"C3BM10,155R7D4U4L7D30R7
U4":CIRCLE(24,163),10,3,1,.65,.1
5:CIRCLE(25,177),10,3,1,.85,.4:C
IRCLE(24,163),5,3:CIRCLE(25,177)
,5,3:PAINT(15,160),3
300 DRAW"C1BM40,170D15R7U15L7":C
IRCLE(44,160),5,1:PAINT(44,160),
1:PAINT(44,175),1
310 DRAW"C3BM57,170R7D4U4L7D15R7
U6":CIRCLE(71,177),8,3,1,.60,.89
:CIRCLE(71,184),8,3,1,.60,.88:DR
AW"C3BM75,173D4":PAINT(60,175),3
320 DRAW"C4BM90,170U5R7D5R5D7L5D
8L7U8L5U7R5":PAINT(93,175),4
330 DRAW"C1BM113,155R7D15U15L7D3
0R7U5":CIRCLE(128,177),10,1,1,.6
2,.1:CIRCLE(124,184),8,1,1,.62,.
047:DRAW"C1BM133,185R3U3":PAINT(
116,160),1
340 CIRCLE(155,177),10,3,1,.15,.
9:DRAW"C3BM162,172U18R7D32L7U4":
CIRCLE(155,177),5,3:PAINT(165,17
8),3
350 CIRCLE(185,177),10,4,1,.15,.
9:DRAW"C4BM193,172U4R7D18L7U4":C
IRCLE(185,177),5,4:PAINT(191,177
),4
360 DRAW"C1BM212,168F8G15R9E23L9
G3H3L9":PAINT(219,171),1
370 DRAW"C3BM245,155D20R7U20L7":
CIRCLE(249,183),5,3:PAINT(248,16
0),3:PAINT(249,183),3
380 SCREEN1,1:FORX=1TO250:PSET(R
ND(255),RND(191),RND(8)):NEXT
390 FORY=1TO15:FORX=1TO100:NEXTX
:SCREEN1,1:FORX=1TO100:NEXTX:SCR
EEN1,0:NEXTY
400 PLAY"O3T5L4CP100CL2DCFL1EL4C
P100CL2DCGL1FL4CP100CO4L2CO3AL4F
P100FL2EL1DL4B-P100B-L1AFGFP1"
410 SCREEN1,1:PLAY"T5L4CP100CL2D
CFL1ET8L4CDEGAEGEDCP4T5L4CP100CL
2DCGL1FT8L4FGAO4CDO3AO4CO3AGFP4T
5CP100CO4L2CO3AL4FP100FL2EL1DT8L
4B-P100B-FP100FDP100DCO2A+P4T5O3
L4B-P100B-L1AFGFP1T8L4FP100FDP10
0DCO1AGL1FP1":RUN
```





The Plants are Always Greener on the CoCo Side

By Larry E. Jones

The big secret to having a green thumb is knowing how often to feed and water your plants (most people water too often, which kills them faster than not watering often enough). Also important is knowing how much light to give each plant. If you have a variety of plants, it can be a real hassle remembering the requirements of each.

Plantlog is a file program for the Color Computer with at least 16K that remembers individual plant requirements for you. Though most of the menu options are self-explanatory, I will go through each of them for those who are new to database-type programs.

Larry Jones is a self-taught programmer. He is currently working toward degrees in English and computer information systems at the University of Southern Indiana in Evansville.

Menu Options

After loading *Plantlog*, the menu appears on the screen; the first option, LOAD FILE, is in inverse letters. Each time the space bar is pressed the next option appears in inverse and the previous option returns to normal print. Press ENTER when the option desired is in inverse letters. The menu then wraps around, that is, when you reach the last option, press the space bar again and you will be back on LOAD FILE. If ENTER is pressed for the wrong option, don't worry — each time you press ENTER from the menu you get a Y/N prompt; if you answer 'N', nothing happens and you can make another choice.

LOAD FILE: This lets you load information from a previously saved file (more on that later). You may specify the filename or simply press ENTER if the file is saved as *PLDAT*. You may load a file from tape or disk.

SAVE FILE: This allows you to save an information file you have entered using the ADD TO FILE option. Again, you may specify the filename or press ENTER to save the file as *PLDAT*, and you may save the file to tape or disk.

CHECK TODAY: This option is very handy. After loading your file, this option prompts for the date (be sure to enter all dates in day/month/year separated by slash marks and use double digits, for example: 01/12/85). *Plantlog* then compares the date with the next water and feed dates of each plant in the file. If any are due or overdue, it prints that plant's record on the screen and asks if you want to update the water and feed dates. You should water/feed the plant in question and enter 'Y' in reply to the prompt. The program automatically updates the next water and feed dates for that plant. This procedure is repeated for each plant that is due, then you are returned to the menu. If you have updated a record, be sure to save your new file by choosing the SAVE FILE option.

LOOK ALL: This allows you to

look at your entire file. Each record is printed on the screen; when you are ready to see the next record, press any key. When you reach the file's end, you are returned to the menu.

LOOK ONE: If this option is chosen, you are shown all the plant names in your file and asked to enter the name of the plant whose record you wish to see. That record is printed on the screen and you may press any key to return to the menu.

CHANGE ENTRY: This lets you correct misspellings or change the elapsed time between watering or feeding (in case your guess or the book was wrong). You are shown the names of the plants in the file and asked which contains the line you want to change. Enter the plant name and that record is printed on the screen. You are then asked which line you want to change. Enter the label (plant name, light, etc.), the old line is printed at the bottom of the screen, and you are asked to enter the corrected line. Next, you are asked if you want the old line replaced by the new line. If you answer 'Y', the change will be made; if you answer 'N', no changes are made. You may press 'M' to return to the menu. Remember, if a change is made you must save the new file or the change will not be recorded.

ADD TO FILE: This option is used to create a new file or add to an existing file. If you wish to create a new file, do not load a previously saved file but go directly to ADD TO FILE. If you wish to add to a previously saved file, load the file then choose the ADD TO FILE option. You are shown the record number ('1' for a new file or 1 plus the number of records in an old file) and prompted to enter the necessary information for each record. This option asks for plant name, light, type of food, last water date, number of days between watering, last feed date and number of days between feeding. The last input allows you to enter any comments or reminders. ADD TO FILE automatically computes the next water and feed dates. You may add as many new records as desired as long as the total for that file does not exceed 50. When finished, enter *** at the plant name prompt and you are returned to the menu, at which time you should save the new or expanded file.

DELETE FROM FILE: Even the best of us lose one every now and then. This option lets you remove the unpleasant memory from the file. You are shown the plant names in the file and asked which you wish to remove. Enter the name of the plant and you are asked if you really want to delete that record. If you answer 'Y', the record ceases to exist and each record with a higher number is dropped down one to fill the gap. You are returned to the menu where you should save the new (shorter) file. If you answer 'N' to the delete prompt, you are returned to the menu with no changes.

All sequential files work more or less the same, so if you are interested in learning how to write a file program you might want to study *Plantlog*. The `REM` statements tell what lines do what. The variable list is shown in Figure 1.

Plantlog makes it easier to care for your plants, and if you don't have any, this program gives you some ideas on how to brighten up that dreary computer room. Plants not only brighten up a room, but also give off oxygen. When you are programming, you need all of the oxygen you can get!

Figure 1

Variables	Function
M1$ array	Menu options (capitals)
M2$ array	Menu options (inverse)
L$ array	Labels (plant name, etc.)
E$ array	Holds file after loading
TI$	Title
F$	Filename (`LOAD-SAVE`)
TD$	Today's date (check today)
C$	Line to change (change entry)
C1$	New line (change entry)
DV$	Device (tape-disk)
LN$	Prints a line on the screen
Y$	Used for all yes/no prompts
NR	Number of records in file
NF	Number of fields in record
L array	Used to center menu option on screen
ED/EM/EY	Day/month/year entered (check today)
DW/MW/Y1	Water day/month/year (check today)
DF/MF/YF	Feed day/month/year (check today)

(Any questions about this program may be directed to the author at 1713 Delmar Avenue, Evansville, IN 47712, phone 812-424-1026. When writing, please enclose an SASE for a reply.) ☐

90	138
240	33
300	239
440	84
560	208
END	18

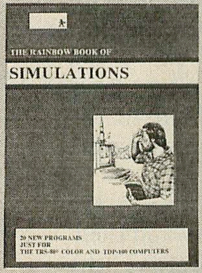
The listing: `PLANTLOG`

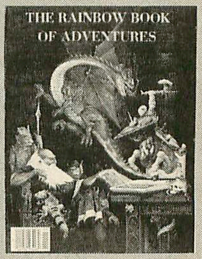
```
10 CLEAR:CLEAR1000:NR=50:NF=10:M
U=8:DIME$(NR,NF):LN$=STRING$(32,
45):TI$="plant log "
20 REM get labels
30 FORX=1 TONF:READL$(X):NEXT:DA
TA PLANT NAME,LIGHT,CURRENT FOOD
,LAST WATER DATE,# DAYS WAIT(W),
next water date,LAST FEED DATE,#
 DAYS WAIT(F),next feed date,COM
MENTS
40 REM get menu options
50 FORX=1 TOMU:READM1$(X),M2$(X)
:L(X)=INT((32-LEN(M1$(X)))/2):NE
XT
60 DATA LOAD FILE,load file,SAVE
 FILE,save file,CHECK TODAY,chec
k today,LOOK ALL,look all,LOOK O
NE,look one,CHANGE ENTRY,change
entry,ADD TO FILE,add to file,DE
LETE FROM FILE,delete from file
70 REM print menu
80 CLS:PRINTTAB(11)"plant log":P
RINTLN$:PRINTTAB(14)"MENU":PRINT
TAB(12)STRING$(8,45):FORX=1 TOMU
:IFX=1 THENPRINTTAB(L(X))M2$(X):
NEXT ELSEPRINTTAB(L(X))M1$(X):NE
XT:PRINT:PRINTTAB(3)"space FOR I
```

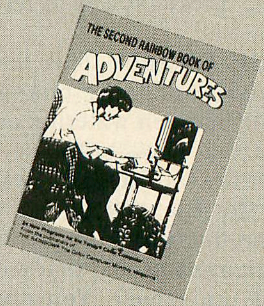
Recommended Reading for Your CoCo from . . .

The Rainbow Bookshelf

THE COMPLETE RAINBOW GUIDE TO
OS-9
By Dale L. Puckett and Peter Dibble


THE RAINBOW BOOK OF
SIMULATIONS
20 NEW PROGRAMS JUST FOR THE TRS-80 COLOR AND TDP-100 COMPUTERS





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```
TEM THEN enter";:I=1:Y=128+(I*32
)+L(1)
90 REM scroll title
100 FORX=1 TO100:IFINT(X/10)=X/1
0 THENPRINT@11,RIGHT$(TI$,LEN(TI
$)-X/10);:PRINTLEFT$(TI$,X/10)
110 REM get menu input
120 I$=INKEY$:IFI$=CHR$(32)THEN1
30 ELSEIFI$=CHR$(13)THEN150 ELSE
NEXT:GOTO100
130 PRINT@Y,M1$(I):I=I+1:IFI>MU
THENI=1
140 Y=128+(I*32)+L(I):PRINT@Y,M2
$(I):GOTO100
150 PRINT@Y+LEN(M1$(I)),"(Y/N)";
:INPUTY$:IFY$="N" THENPRINT@Y+LE
N(M1$(I)),STRING$(6,32):GOTO100
ELSEIFY$<>"Y" THEN150
160 REM check for empty file buf
fer
170 IFI<>1 ANDI<>7 THENGOSUB720
180 CLS:ON I GOTO 200,230,260,35
0,390,410,460,510
190 REM load file
200 GOSUB580:OPEN"I",#DV,F$:FORX
=1 TONR:FORY=1 TONF:INPUT#DV,E$(
X,Y):IFE$(X,1)="***"THEN210 ELSE
NEXTY:NEXTX
210 CLOSE#DV:GOTO80
220 REM save file
230 GOSUB580:OPEN"O",#DV,F$:FORX
=1 TONR:FORY=1 TONF:WRITE#DV,E$(
X,Y):IFE$(X,1)="***"THEN240 ELSE
NEXTY:NEXTX
240 CLOSE#DV:GOTO80
250 REM check today
260 PRINT@224,"ENTER TODAY'S DAT
E (DD/MM/YY)":INPUTTD$:IFLEN(TD$
)<>8 THENCLS:GOTO260 ELSEED=VAL(
LEFT$(TD$,2)):EM=VAL(MID$(TD$,4,
6)):EY=VAL(RIGHT$(TD$,2))
270 FORZ=1 TONR:IFE$(Z,1)="***"T
HEN80 ELSEIFE$(Z,6)=TD$ ORE$(Z,9
)=TD$ THENCLS:PRINT:X=Z:GOSUB360
:GOTO290
280 ED=VAL(LEFT$(TD$,2)):EM=VAL(
MID$(TD$,4,6)):EY=VAL(RIGHT$(TD$
,2))
282 DW=VAL(LEFT$(E$(Z,6),2)):MW=
VAL(MID$(E$(Z,6),4,6)):YW=VAL(RI
GHT$(E$(Z,6),2)):DF=VAL(LEFT$(E$
(Z,9),2)):MF=VAL(MID$(E$(Z,9),4,
6)):YF=VAL(RIGHT$(E$(Z,9),2)):O$
="overdue"
284 IFEY>YF OR EY>YW THEN289
285 IFEM>MF OR EM>MW THEN289
```

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```
286 IFED>DW AND EM>=MW OR ED>DF
AND EM>=MF THEN289
288 GOTO330
289 CLS:PRINTO$:X=Z:GOSUB360
290 PRINT:INPUT"UPDATE WATER (Y/
N)";Y$:IFY$="N"THEN310 ELSEIFY$<
>"Y"THEN290
300 Y=6:E$(Z,4)=TD$:GOSUB640
310 INPUT"UPDATE FEED (Y/N)";Y$:
IFY$="N"THEN330 ELSEIFY$<>"Y"THE
N310
320 Y=9:E$(Z,7)=TD$:GOSUB640:CLS
:PRINT:GOSUB360:GOSUB560
330 NEXTZ:GOTO80
340 REM look all
350 FORX=1 TONR:IFE$(X,1)="***"T
HEN370 ELSECLS:PRINTTAB(9)"file
entry #"X:PRINTLN$:GOSUB360:GOSU
B560:NEXTX:GOTO370
360 FORY=1 TONF-1:PRINTL$(Y)": "
E$(X,Y):NEXTY:PRINTL$(10)":"E$(X
,10):RETURN
370 CLS:PRINTTAB(10)"end of file
":GOSUB560:GOTO80
380 REM look one
390 GOSUB620:CLS:PRINT:GOSUB360:
GOSUB560:GOTO80
400 REM change entry
410 GOSUB620
420 CLS:PRINT:GOSUB360:PRINT:INP
UT"LINE TO CHANGE OR M FOR MENU"
;C$:IFC$="M"THEN80 ELSEFORY=1 TO
NF:IFL$(Y)=C$ THEN430 ELSENEXTY:
GOTO420
430 PRINTL$(Y)": "E$(X,Y):PRINT"
NEW "C$;:INPUTC1$:IFLEN(C1$)<1 T
HEN430 ELSEE$(X,Y)=C1$:IFY=4 ORY
=7 THENZ=X:Y=Y+2:GOSUB640
440 INPUT"IS THIS CORRECT (Y/N)"
;Y$:IFY$="N"THEN430 ELSEIFY$="Y"
 THEN420 ELSE440
450 REM add to file
460 FORX=1 TONR:IFE$(X,1)="***"O
RE$(X,1)=""THEN470 ELSENEXTX:PRI
NTTAB(11)"file full":GOSUB560:GO
TO80
470 FORZ=X TONR:CLS:PRINTTAB(9)"
file entry #"Z:PRINTLN$;:PRINT"d
ates must be: day/month/year.  d
ouble digits separated by /     e
xample (01/02/85)":FORY=1 TONF
480 IFY=6 ORY=9 THENGOSUB640:PRI
NTL$(Y)": "E$(Z,Y):NEXTY
490 PRINTL$(Y)": ";:INPUTE$(Z,Y)
:IFE$(Z,1)="***"THEN80:NEXTY:NEX
TZ ELSENEXTY:NEXTZ:CLS:PRINT@246
,"file full":GOSUB560:GOTO80
500 REM delete from file
510 GOSUB620:CLS:PRINT:GOSUB360:
PRINT:INPUT"DELETE THIS ENTRY (Y
/N)";Y$:IFY$="N"THEN80 ELSEIFY$<
>"Y"THEN510
520 CLS:PRINT@224,"DELETING "PN$
"..."
530 FORZ=X TONR:FORY=1 TONF:E$(Z
,Y)=E$(Z+1,Y):NEXTY:IFE$(Z,1)="*
**"THEN550
540 NEXTZ
550 PRINT:PRINTPN$" HAS BEEN DEL
ETED":GOSUB560:GOTO80
560 PRINT@485,"any key to contin
ue";
570 I$=INKEY$:IFI$=""THEN570 ELS
E RETURN
580 PRINT@234,"tAPE OR dISK";:IN
PUTDV$:IFDV$="T"THENDV$="TAPE":D
V=-1 ELSEIFDV$="D"THENDV$="DISK"
:DV=1 ELSE580
590 PRINT@289,"FILENAME OR <ENTE
R> FOR PLDAT":PRINTTAB(12);:INPU
TF$:IFLEN(F$)=0 THENF$="PLDAT":P
RINT@334,F$ ELSEIFLEN(F$)>8 THEN
590
600 PRINT:PRINTTAB(2)"READY "DV$
" AND PRESS enter";:INPUTY$:RETU
RN
610 REM look for entry
620 FORX=1 TONR STEP2:IFE$(X,1)=
"***" THEN625 ELSEPRINTE$(X,1)"
- ";:IFE$(X+1,1)="***"THEN625 EL
SEPRINTE$(X+1,1):NEXT
625 PRINT:PRINTLN$;:INPUT"PLANT
NAME";PN$:IFLEN(PN$)<1 THEN620 E
LSEFORX=1 TONR+1:IFE$(X,1)=PN$ T
HENRETURN
630 IFE$(X,1)="***"ORX=NR+1 THEN
PRINT:PRINTPN$" NOT FOUND":GOSUB
560:GOTO80 ELSENEXT
640 D=VAL(E$(Z,Y-1)):DD=VAL(LEFT
$(E$(Z,Y-2),2)):DM=VAL(MID$(E$(Z
,Y-2),4,6)):DY=VAL(RIGHT$(E$(Z,Y
-2),2))
650 DD=DD+D:IFDM=2 ANDDD>28 THEN
 DD=DD-28:DM=DM+1:GOTO680
660 IFDM=1 ORDM=3 ORDM=5 ORDM=7
ORDM=8 OR DM=10 ORDM=12 THENIFDD
>31 THENDD=DD-31:DM=DM+1:GOTO680
670 IFDD>30 THENDD=DD-30:DM=DM+1
680 IFDM>12 THENDM=1:DY=DY+1
690 DD$=MID$(STR$(DD),2):IFLEN(D
D$)=1 THENDD$="0"+DD$
700 DM$=MID$(STR$(DM),2):IFLEN(D
M$)=1 THENDM$="0"+DM$
710 DY$=MID$(STR$(DY),2):E$(Z,Y)
=DD$+"/"+DM$+"/"+DY$:RETURN
720 CLS:IFE$(1,1)="" THENPRINT@2
31,"file buffer empty":GOSUB560:
GOTO80 ELSERETURN
```

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VCR
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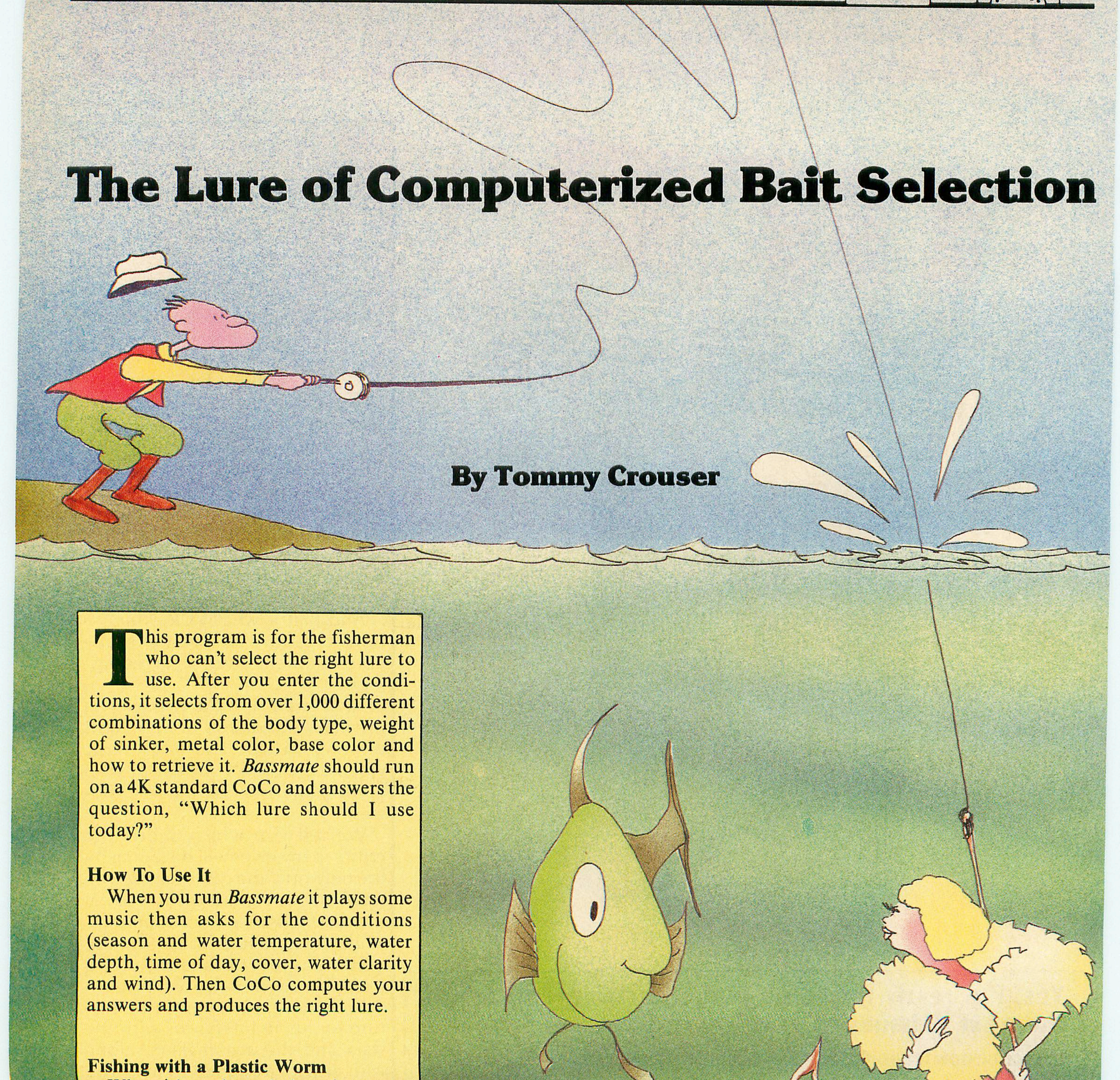
The Lure of Computerized Bait Selection



By Tommy Crouser

This program is for the fisherman who can't select the right lure to use. After you enter the conditions, it selects from over 1,000 different combinations of the body type, weight of sinker, metal color, base color and how to retrieve it. *Bassmate* should run on a 4K standard CoCo and answers the question, "Which lure should I use today?"

How To Use It

When you run *Bassmate* it plays some music then asks for the conditions (season and water temperature, water depth, time of day, cover, water clarity and wind). Then CoCo computes your answers and produces the right lure.

Fishing with a Plastic Worm

When it's early and there is a grass cover, the program will select a worm. Actually, worm fishing can be done in almost any kind of conditions and should be used at least half of the time when bass fishing. Here's what happens

---

Tommy Crouser is 14 and a ninth grader at Dunbar Junior High in Dunbar, West Virginia. His hobbies are fishing, playing tennis, building models and programming his CoCo.

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If you have been waiting for a game for your color computer that has everything, your wait is over. **WARP FACTOR X** is here. This all graphics simulation game requires strategy, fast thinking, an eye for detail, and above all experience in knowing the capabilities of your starship and its computer. (See review in Feb. 85 issue of Rainbow.) It requires 32K one disk drive and comes packaged in a vinyl library case. **$34.95**

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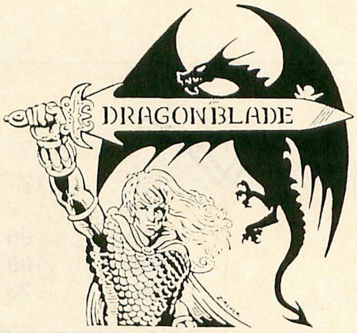
You and your comrades will explore the levels of Darkmoor Hold in an effort to gain great riches and defeat the dark wizard. The Wizard will soon realize the threat you pose and the many monsters you meet and battle will become stronger and more powerful as you move through the 10 levels of Darkmoor. A keen eye will help you find weapons and armor to aid your battle along with treasures for you to keep. Your party consists of a Dwarf, an Elf, and you, the Human, each with their own special attributes. The weapons, armor and treasure are placed randomly in each level to provide a new challenge each time you play. You may also save the game you are playing since defeating the evil Wizard is not an easy task. It has great graphics and an impressive text screen to give you more fun than a barrel of elves. Requires 64KEB and 1 disk drive. **$29.95**



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when a worm passes a bass: The bass *stays in place* and sucks in the worm from as far away as 15 inches.

The worm jumps into its mouth because of the powerful outward thrust made with both gills when its mouth opens, which creates a forceful suction. It takes less than 1/24 of a second. When you feel the tug on your worm, set the hook with all your muscle. You must do it before the bass blows it back out. If you don't catch it, don't worry. It's only a part of the game.

Conclusion

The lures the program picks usually catch bass, but will also catch walleye, big trout, northern pike, pickerel and salmon. Don't be surprised if you end up catching an award-winning fish.

If you have any questions or problems send an SASE, or if you just want to tell me the biggest fish you've ever caught, write to 112 Greenbrier Lane, Dunbar, WV 25064. ☐

130 171
310 7
530 96
690 109
END 23

The listing: BASSMATE

```
1 REM****************************
2 REM*****      TRS-80      *****
3 REM*****     bassmate     *****
4 REM*****        BY        *****
5 REM***** TOMMY CROUSER    *****
6 REM****************************
10 CLS
20 PRINT "            TRS-80 bassmat
e
                 BY

               TOMMY CROUSER
"
30 PRINT
40 PRINT "                      FOR"
50 PRINT
60 PRINT "          rainbow MAGAZIN
E"
70 FOR S=1 TO 5
80 SOUND 100,5:SOUND 130,3:SOUND
 100,5:SOUND 80,3:SOUND 130,5:SO
UND 160,3:SOUND 130,5:SOUND 100,
3
90 NEXT S
100 SOUND 100,5:SOUND 130,3:SOUN
D 100,5:SOUND 80,3
110 CLS
120 PRINT "SEASON: 1>SPRING (WT:
35-55 F)           2>SUMMER (WT:
55-80 F)           3>FALL   (WT:
40-60 F)           4>WINTER (WT:
15-35 F)   WT: WATER TEMPERATURE
"
130 PRINT
140 INPUT SEA
150 IF SEA<1 OR SEA>4 THEN 110
160 CLS
170 PRINT "WATER DEPTH (FT): 1>1
-12                          2>1
3-29                         3>3
0-60"
180 PRINT
190 INPUT WD
200 IF WD<1 OR WD>3 THEN 160
210 CLS
220 PRINT "TIME OF DAY: 1>EARLY
                        2>MID-DA
Y                       3>LATE"
230 PRINT
240 INPUT TD
250 IF TD<1 OR TD>3 THEN 210
260 CLS
270 PRINT "COVER: 1>TIMBER
                  2>ROCKS
```

THE EXPERTS AGREE

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```
                 3>GRASS
                 4>NONE"
280 PRINT
290 INPUT COV
300 IF COV<1 OR COV>4 THEN 260
310 CLS
320 PRINT "WATER CLARITY: 1>MUDD
Y                         2>MURK
Y                         3>CLEA
R"
330 PRINT
340 INPUT WC
350 IF WC<1 OR WC>3 THEN 310
360 CLS
370 PRINT "WIND: 1>CALM
                 2>MODERATE
                 3>STRONG"
380 PRINT
390 INPUT W
400 IF W<1 OR W>3 THEN 360
410 CLS
420 FOR Y=1 TO 100
430 PRINT@203,"computing";
440 PRINT@RND(512),"*";
450 SOUND RND(255),1
460 NEXT Y
470 CLS
480 PRINT "BODY TYPE:"
490 IF COV=1 AND TD=1 THEN PRINT
 "chugger"
500 IF COV=1 AND TD=2 THEN PRINT
 "spoon":GOTO 610
510 IF COV=1 AND TD=3 THEN PRINT
 "lizard":GOTO 610
520 IF COV=2 AND TD=1 THEN PRINT
 "jig":GOTO 610
530 IF COV=2 AND TD=2 THEN PRINT
 "grub":GOTO 610
540 IF COV=2 AND TD=3 THEN PRINT
 "buzzbait":GOTO 610
550 IF COV=3 AND TD=1 THEN PRINT
 "worm":GOTO 610
560 IF COV=3 AND TD=2 THEN PRINT
 "spinner":GOTO 610
570 IF COV=3 AND TD=3 THEN PRINT
 "minnow":GOTO 610
580 IF COV=4 AND WD=1 THEN PRINT
 "shallow crankbait":GOTO 610
590 IF COV=4 AND WD=2 THEN PRINT
 "midwater crankbait":GOTO 610
600 IF COV=4 AND WD=3 THEN PRINT
 "deepwater crankbait"
610 PRINT "WEIGHT OF SINKER:"
620 IF WD=1 AND W=1 OR WD=1 AND
W=2 THEN PRINT "1/8":GOTO 670
630 IF WD=1 AND W=3 OR WD=2 AND
W=1 THEN PRINT "1/4":GOTO 670
640 IF WD=2 AND W=2 OR WD=2 AND
W=3 THEN PRINT "3/8":GOTO 670
650 IF WD=3 AND W=1 OR WD=3 AND
W=2 THEN PRINT "1/2":GOTO 670
660 IF WD=3 AND W=3 THEN PRINT "
1"
670 PRINT "COLOR:"
680 IF WC=1 THEN PRINT "fluoresc
ent":GOTO 710
690 IF WC=2 THEN PRINT "gold":GO
TO 710
700 IF WC=3 THEN PRINT "silver"
710 PRINT "BASE COLOR:"
720 IF SEA=1 OR SEA=3 THEN PRINT
 "medium":GOTO 750
730 IF SEA=2 THEN PRINT "light":
GOTO 750
740 IF SEA=4 THEN PRINT "dark"
750 PRINT "RETRIEVE:"
760 IF TD=1 THEN PRINT "slow":GO
TO 790
770 IF TD=2 THEN PRINT "jerky":G
OTO 790
780 IF TD=3 THEN PRINT "moderate
"
790 INPUT "AGAIN";A$
800 IF A$="Y"OR A$="YES"THEN 110
 ELSE END
```

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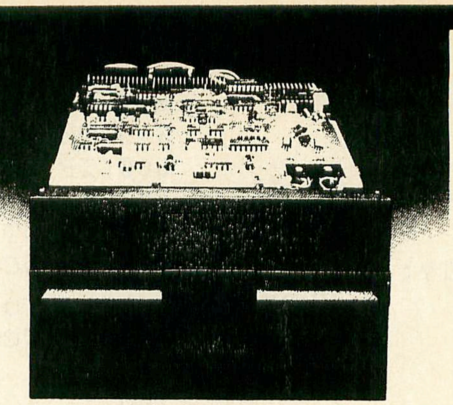

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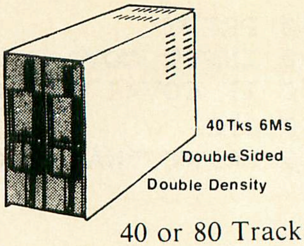

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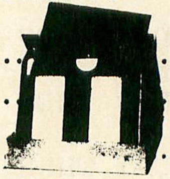

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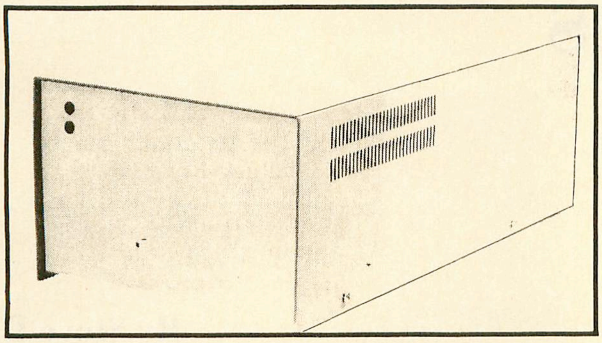

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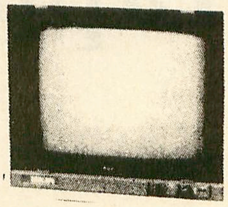

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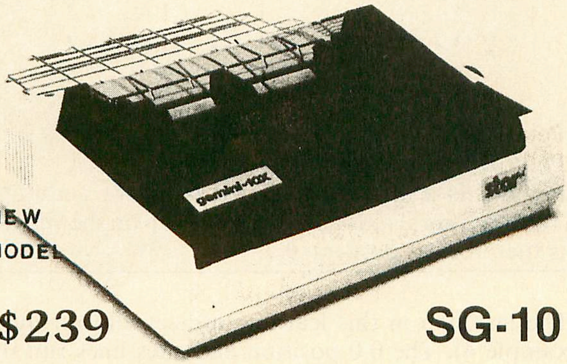

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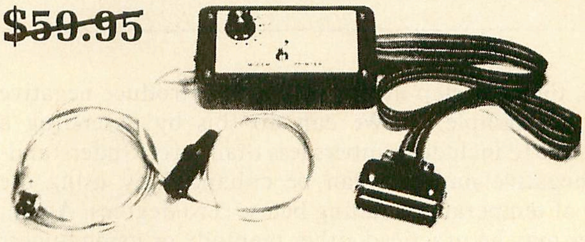

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Locating Points on a Graph

By Steve Blyn
Rainbow Contributing Editor

This month's article presents a program that enables students to practice locating points on all four quadrants of a graph.

A good start to understanding graphs is a simple number line, as shown in Example 1. This beginner's number line deals only with positive numbers. The arrow at the end of line indicates that the line could go on and on. Students may practice simple addition and subtraction on such number lines. They can solve them mentally or may count fingers to figure out the solution of examples such as 3 + 2 or 4 - 3.

Example 1

```
.-----.-----.-----.-----.----.-->
0     1     2     3     4    5
```

Often, the next step in this skill is to introduce negative numbers (Example 2). We can do this by extending a number line to include numbers less than zero. Understanding of negative numbers can be enhanced by using the analogy of temperatures falling below zero degrees. Again, examples may be practiced either mentally or using fingers to count out the answer.

Example 2

```
<--.-----.-----.-----.-----.-----.-----.----.-->
  -3    -2    -1     0    +1    +2    +3   +4
```

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The next step in this learning process is to describe a point in relation to both the 'X' and 'Y' axes. This, of course, normally takes place several grades later in school. (We are condensing several grades into a mini-course for the purposes of this article.) The lower left-hand corner indicates the (0,0) location. We count across to get the 'X' location and up to get the 'Y' location. Example 3 below has three points to find for practice.

Example 3

```
  !     !     !     !     !
3 !-----!-----!-----!-----B--
  !     !     !     !     !
  !     !     !     !     !
2 C-----!-----!-----!-----!--
  !     !     !     !     !
  !     !     !     !     !
1 !-----!-----!-----A-----!--
  !     !     !     !     !
  !     !     !     !     !
0 !-----!-----!-----!-----!--
  0     1     2     3     4
```

Point A is located at position 3,1.

Point B is at position 4,3.

Point C is a little bit tricky. It is a zero amount across on the horizontal axis and two places up on the vertical axis. It is therefore at position 0,2.

The last step in this learning utilizes all four quadrants (Example 4). The 0,0 position and axes lines run through the middle of this graph creating the four quadrants. The top right-hand quadrant is often referred to as Quadrant 1. We continue to count counter-clockwise to the other quadrants. Quadrant four is the bottom right-hand quadrant.

Example 4

Quadrant 2 **Quadrant 1**

```
  !     !     !     !     !     !     !
--!-----!-----!-----!-----!-----A-----!--
  !     !     !   +2!     !     !     !
  !     !     !     !     !     !     !
--!-----B-----!-----!-----!-----!-----!--
  !     !     !   +1!     !     !     !
  !     !     !     !     !     !     !
--!-----!-----!-----*-----!-----!-----!--
-3!   -2!   -1!    0!    1!    2!    3!
  !     !     !     !     !     !     !
--!-----!-----!-----!-----!-----!-----!--
  !     !     !   -1!     !     !     !
  !     !     !     !     !     !     !
--!-----!-----!-----!-----D-----!-----!--
  !     !     !   -2!     !     !     !
  !     !     !     !     !     !     !
--C-----!-----!-----!-----!-----!-----!--
  !     !     !   -3!     !     !     !
  !     !     !     !     !     !     !
```

Quadrant 3 **Quadrant 4**

Point A is located at position +2,+2.
Point B is located at position −2,+1.
Point C is located at position −3,−3.
Point D is located at position +1,−2.

Our program asks students to locate a given point on a graph that demonstrates all four quadrants. If correct, another point appears. If incorrect, the child may try again until correct. We feel this is the type of skill area that most middle-grade students can master completely with time. At any rate, this skill (at this level of sophistication) soon becomes an all or nothing proposition. Therefore, we made no attempt at any kind of scoring.

We ask that students be requested to indicate a sign before each number. Positive numbers, as well as zero, are commonly assumed to be positive. We felt, however, that it is a good practice to include a sign before each number. The extra effort involved in placing the sign can result in better comprehension of the skill in the long run.

Lines 460-660 store graphics representations of the letters, numbers and signs that we will need. They are stored as strings for easy drawing of them later. Lines 60-160 draw lines of the graph. Lines 170-240 select and draw a random point on the graph. This point is represented to the computer by the letters 'C' and 'D'.

Lines 300-400 get and interpret the student's answer. This answer is represented to the computer as 'M' and 'N'. If M=C and N=D, then the child is correct and a happy tune is played. If incorrect, the child's answer is erased and a new answer may be entered for the same example.

The program may be continued or ended after a correct answer. Pressing the 'E' key ends the program; pressing any other key presents a new example. We at Computer Island hope this program helps your child or students to better understand and enjoy this type of graph. ☐

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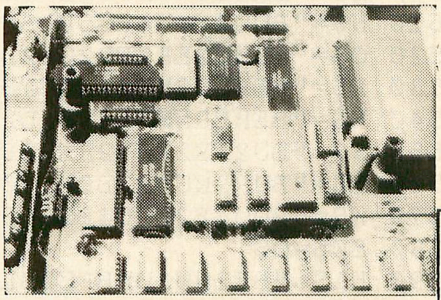

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```
240 ......204
360 ......153
END ......21
```

The listing: GRAPH

```
10 REM"FINDING POINTS ON A GRAPH
"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,NY,1986"
30 PCLS:SCREEN1,1:PMODE4,1:CIRCL
E(128,96),10:PCLS:SCREEN1,1
40 CLEAR 3000
50 GOSUB 460
60 FOR T= 1 TO 10
70 LINE(20+L,5)-(20+L,120),PSET
80 L=L+24
90 NEXT T
100 FOR T=1 TO 7
110 LINE(10,10+K)-(245,10+K),PSE
T
120 K=K+18
130 NEXT T
140 REM"DRAW MIDDLE AXES"
150 LINE(114,3)-(118,122),PSET,B
F
160 LINE(5,62)-(250,66),PSET,BF
170 REM"CHOOSE THE POINT"
180 X= RND(10)-1
190 A=20+X*24
200 Y=RND(7)-1
210 B=10+Y*18
220 CIRCLE(A,B),5
230 C=X-4:D=Y-4
240 IF Y=0THEN D=3 ELSE IF Y=1 T
HEN D=2 ELSE IF Y=2 THEN D=1 ELS
E IF Y=3 THEN D=0 ELSE IF Y=4 TH
EN D=-1 ELSE IF Y=5 THEN D=-2 EL
SE D=-3
250 DRAW"S8A2BM10,140"+W$+H$+E$+
R$+E$+SP$+I$+S$+SP$+T$+H$+E$
260 DRAW"BM20,160"+P$+O$+I$+N$+T
$+SP$+N$+O$+W$
270 COLOR 1:LINE(170,170)-(240,1
70),PSET
280 CIRCLE(195,165),5,1,1,.01,.2
5
290 DRAW"BM165,155"+SP$
300 NN$=INKEY$
310 IF NN$="-" THEN DRAW E8$ ELS
E IF NN$="+" THEN DRAW E9$ ELSE
300
320 EN$=INKEY$
330 IF EN$="0" THEN DRAW E0$ ELS
E IF EN$="1" THEN DRAW E1$ ELSE
IF EN$="2" THEN DRAW E2$ ELSE IF
 EN$="3" THEN DRAW E3$ ELSE IF E
N$="4" THEN DRAW E4$ ELSE IF EN$
="5" THEN DRAW E5$ ELSE 320
340 M=VAL(EN$):IF NN$="-" THEN M
=-M
350 DRAW"BM210,155"+SP$
360 MM$=INKEY$
370 IF MM$="-" THEN DRAW E8$ ELS
E IF MM$="+" THEN DRAW E9$ ELSE
360
380 Z$=INKEY$
390 IF Z$="0" THEN DRAW E0$ ELSE
 IF Z$="1" THEN DRAW E1$ ELSE IF
 Z$="2" THEN DRAW E2$ ELSE IF Z$
="3" THEN DRAW E3$ ELSE IF Z$="4
" THEN DRAW E4$ ELSE IF Z$="5" T
HEN DRAW Z5$ ELSE 380
400 N=VAL(Z$):IF MM$="-" THEN N=
-N
410 IF M=C AND N=D THEN PLAY"L10
CDECDEGGGG":GOTO 430
420 IF M<>C THEN COLOR 0: LINE(1
50,150)-(250,180),PSET,BF:GOTO 2
70
430 GN$=INKEY$
440 IF GN$="E" THEN 450 ELSE IF
GN$<>"" THEN RUN ELSE 430
450 CLS:END
460 REM"THE LETTERS AND NUMBERS"
470 E$="BER3U2NL2U2L4BG5BL2"
480 G$="BUR4U3HL2GDRBG3BL4"
490 H$="BUU2NU2R4NU2D2BGBL9"
500 I$="BR2BUU4BU2BD7BL8"
510 N$="BUU4F4U4BG5BL5"
520 O$="BEHU2ER2FD2GL2BGBL6"
530 P$="BER3U2NU2L3GNFBG2BL4"
540 R$="BEHERNH2R2NU2D2L3BGBL6"
550 S$="BU2FR2EHL2HER2FBG4BL6"
560 T$="BUR2NU4R2BDBL10"
570 W$="BUU4F2E2D4BGBL9"
580 E0$=O$
590 E1$="BE2NU3DEBFBGBL9"
600 E2$="BENR3HER3U2L4BG5BL"
610 E3$="BENR3HENR2HER3BG5BL5"
620 E4$="BENU4E3L4BG4BL2"
630 E5$="BER4U2L3HER3BG5BL5"
640 E8$="BR4BU4R4BL12BD4":'MINUS
 SIGN
650 E9$="BR4BU4R4L2U2D4U2BL12BD4
":'PLUS SIGN
660 SP$="BE4BUBG5BL5"' ***SPACER
670 RETURN
```

Examining the effects of some important trends that are beginning to evolve. . .

The Demographics of Education

By Michael Plog, Ph.D.
Rainbow Contributing Editor

The field of demography is concerned with the vital statistics of a population — things like births, deaths, marriages, income for families. Demographic information is produced in large quantities by the federal government, all state governments and many private concerns. Demographers use mathematical techniques to predict future growths of populations and to plot trends. Generally, these predictions are so accurate that we have come to accept them almost without question.

Sometimes demographic reports catch a wider public notice than just the planners using the information. A 1984 report from the U.S. Bureau of the Census, for example, claimed that only four percent of the nation's households are traditional — father works, mother does not, with two children under 18. This finding was supposed to point out the changing demographic features of American families. It is true that modern families are changing compared with their grandparents: more mothers work outside the home, family size is smaller and couples are having their first child at an older age.

In this particular case, however, the finding distorts the truth by the use of the term "traditional." The definition is too restrictive. It excludes families we would normally consider traditional: three-child households; two children, one 15 and one 19 (both must be under 18); etc. Thus, while the interpretation is somewhat correct (modern families have different demographic characteristics than families of the past), the case is overstated.

Educational institutions are just one segment of society very interested in demographic results. Demographic findings are used to plan for future activities. Those institutions that do not plan tend to find themselves having difficulty when suddenly confronted with a changed population. We should not limit our idea of educational institutions just to public schools. People who develop and sell educational materials are also part of this institution, as well as private schools, colleges, business schools, etc.

Over the past 40 years, education has become a big business. In 1945, the percent of the Gross National Product (GNP) spent on all schools — kindergarten through college — was two percent. That is two cents out of every dollar made in America. In 1975, education's share of the GNP had risen to 7.7 percent. In 1984, it fell to 6.7 percent, due in part to declining numbers of school-age children. The percent fell, but total dollars for education rose from $119 billion in 1975 to $245 billion in 1984. It is no wonder that people involved in the education industry are very interested in projected demographic changes. And changes are predicted: The market for education (generally, children from 5 to 18 years old) is not static.

For the near future, demographic predictions indicate a changing proportion of people in different age groups. The number of children aged 6 to 13 will increase, while 14- to 17-year-olds will decrease. This means elementary schools will have more students in the future than currently enrolled, while secondary schools will have fewer students.

Within the next decade, little change is expected in the number of preschool-

Michael Plog received his doctorate degree from the University of Illinois. He has taught social studies in high school, worked in a central office of a school district and currently is employed at the Illinois State Board of Education.

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ers. In 1985, 3.7 million births were recorded. This will (based on the best predictions available now) rise slightly until 1990, then fall to 3.5 million births by 1995. Based on current information and demographic predictions, the number of preschoolers (children aged 1 to 5) for the next decade will be:

1985 — 17.8 million
1990 — 18.5 million
1995 — 18.0 million

The numbers are not the only thing changing about future students in the schools of this country. The type of parent is also changing. There is a smaller proportion of households rearing children today than in the 1970s. Most families with several children (as opposed to one or two children) are in low income groups.

Right after World War II, this country experienced the "baby boom" as soldiers returned home and started families. These "baby boomers" are now having their own children. Even though they tend to have fewer children than their parents or grandparents, because there are so many baby boomers, the total number of births is growing.

The parents of infants and preschoolers today are interested in education. The baby boomers who are now new parents are the best-educated generation in American history. One out of every four men and one out of every five women of this generation have a college degree. These new parents are creating a market for educational products. The emphasis is for starting educational activities earlier, and having more comprehensive activities than ever before in our history.

There is also an emphasis on "quality time" with children, especially for families with both parents working. This term may be less used today than a few years ago, but the concept appears just as powerful when parents make decisions about entertainment and purchases for the home.

This educational market is represented by purchases of learning toys, books and computer software. The buying patterns of parents of infants and preschoolers is different than that of parents a few decades ago. Parents of young children are now taking the role of teacher. If you want to see a graphic example of this relatively new market, visit a toy shop or preschool department of a large store. You will notice an emphasis on educational toys that just a few years ago represented a very small market.

The emphasis on early education is expected to continue as children grow. Older children (in elementary and perhaps even high school) will represent an expanding market for educational materials sold for home use. It is impossible, of course, to predict the success or failure of a single company such as Tandy, but indications are that computer hardware and software educational products will continue to represent a large market until the end of the century. Thus, machines like the Color Computer will probably continue to enjoy large sales. Also, we should expect to see more products (and producers) of educational software for younger children, as well as for school-age children.

> ***"The baby boomers who are now new parents are the best-educated generation in American history . . . creating a market for educational products."***

One outcome of the changing demographic features of young children is the growth in private schools in the past decade. The National Center for Education Statistics estimated 5.7 million children, aged 3 to 6, were in preprimary programs in 1983, up 33 percent since 1970. Enrollment in such programs (mostly private, but not necessarily church related) is expected to increase 25 percent to 7.1 million by 1993.

What does this mean for schools? Some predictions can be made just considering the projections for the number of students in the future. In 1984, teacher supply was slightly larger than teacher demand. In 1985, the situation was reversed; demand for teachers was slightly larger than the teacher supply. This gap, which creates a teacher shortage, is expected to increase in the future. By 1993, it is estimated that over 220,000 teachers will be needed, but only about 130,000 teachers will be available.

The teacher shortage is compounded by attitudes about schools and teaching. In 1985, the National Center for Education Statistics found that 43 percent of public school teachers would *not* become teachers if they "were starting over again." In 1966, only nine percent of public school teachers would have selected a different career. This attitude on the part of teachers is understandable, given the bad press schools have received lately. It does not, however, inspire confidence that the teacher shortage can be solved by 1993.

A teacher shortage means more than simply larger numbers of students in classes. With a shortage of teachers also comes a shortage of programs. Public schools (as well as mainstream private schools) will probably have to offer the fundamental curriculum areas, but reduce the non-academic studies that are now "electives" for students. Subjects such as art, music and computer instruction may have to be reduced in public schools for lack of trained teachers.

Therefore, one prediction, based on a very liberal interpretation of the demographic information available, is the growth of the "auxiliary" school. Parents may wish to send their children to the regular public school for academic courses and, especially, the college-bound curriculum. Additional subjects parents consider important may well be taught out of school. Indeed, computer instruction is a likely candidate for an auxiliary school. In many communities today, computer courses are taught outside the school by computer specialists, not regular teachers.

The idea of the auxiliary school is not common in our culture. While such programs exist, and have existed for decades in this country, they are currently dealing with a small number of students. Now may be the time for you to start thinking of setting up your special program, so you can be ready for the 1990s.

I welcome any comments, suggestions or thoughts you have to share. I can be reached at 829 Evergreen, Chatham, IL 62629, or on Delphi with the user name MPLOG. ☐

TAKING BASIC TRAINING

16K
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Practicing the Two-Column Format

By Joseph Kolar
Rainbow Contributing Editor

Sometimes we get so engrossed with the arcane mysteries of CoCo that we forget there is a wealth of golden information waiting to be mined from BASIC.

Every beginner who trudges through the first chapters of a BASIC text quickly learns that a comma can be used to create a second column, providing a tool to develop columnar lists. In this tutorial, expect to explore this feature of our beloved CoCo, mainly the creation of word lists in a two-column format.

Our raw material will be the present and future tense of the German verb "to love." If you are studying German or some other language, this tutorial will point you toward ideas that, with CoCo's aid, could make your studies more interesting.

Key in lines 10-19 of Listing 1 and RUN. You will see the present tense of the verb, "to love."

Florida-based Joseph Kolar is a veteran writer and programmer and specializes in introducing beginners to the powers of CoCo.

Ich liebe	I love
Du liebst	You love (singular)
Er liebt	He loves
Wir lieben	We love
Ihr liebt	You love (plural)
Sie lieben	They love

Now type `LIST-19`. In Line 10, we cleared the screen, dropped down a row, indented two spaces, printed ICH LIEBE, spaced over with the space bar to the seventeenth space of the `PRINT@` screen location (the beginning of the right half of the screen) and printed WIR LIEBEN.

Line 11 proved to be a bit easier to create. We could RUN and see if the character 'I' is aligned under 'W'. If it isn't, it is no problem to either delete or insert spaces to line it up. It is no big deal to move the first character of the second column left or right.

Type `EDIT` to get in the edit mode. Advance the cursor with the space bar so it is in the blank area between the two phrases, press 'D' to delete one space; 2D to delete two spaces. Press 'I' and the space bar once to insert one space; 'I' and the space bar twice to put in two spaces. Press ENTER to get out of the edit mode. RUN and check alignment.

In Line 13, add the third person singular and plural in a similar manner. Line 19 is a good device for you to add to your ever-increasing storehouse of knowledge. CoCo awaits your pleasure and when you are ready, `EXEC44539` allows you to continue by depressing any key except BREAK.

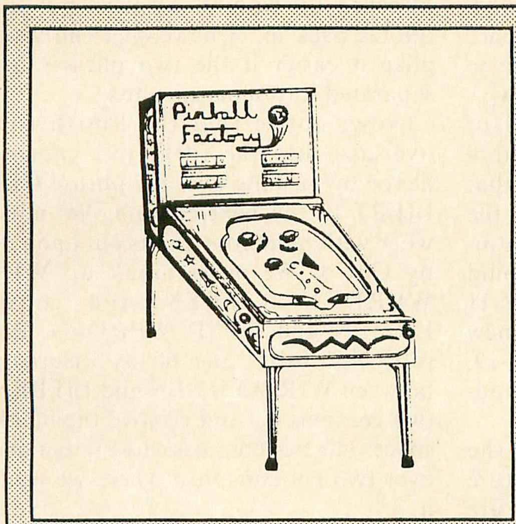
Line 20 combines lines 10-12 and 19 into a multiple statement line. Each line is separated by a colon. The colon warns CoCo that a new statement follows.

Line 30 creates the same word list using the comma to advance to the next entry's beginning location. Note that one big PRINT line is used to enter the entire word list. The advantage is that PRINT need not be used to add each phrase of the list. Make sure each phrase is enclosed in quotes.

If you indent the left column, you must take care to indent whenever a succeeding left column is added. If the sum of the characters and spaces is less than 15 in all the phrases, this is a painless way to make a two-column list.

A good method of attack is to key in one row at a time. RUN and check for errors and misalignment, then make any necessary adjustments and go on to the next row.

The art of entertainment



Pinball Factory by Kary McFadden

The video game comes full circle in this glorious tribute to the original. Classic pinball spings to life as never before, with fresh new angles that only the computer can offer. Crisp graphics, sound, and fast, smooth action give this machine-language arcade game a realistic, responsive feel you'll hardly believe. There are even "tilt" buttons that let you "bump" the machine!

In addition to playing a great game of pinball, you can enjoy hours of creative pleasure as you design, build, and edit your own screens. Save and load your favorite creations. The joystick-controlled cursor makes it all easy.

Change the board: build with bumpers, tabs, and a multitude of solid obstacles to form any configuration imaginable.

Change the face: draw your own title board with lines, rays, and shape patterns. Add text in three different colors, and two dirrent sizes.

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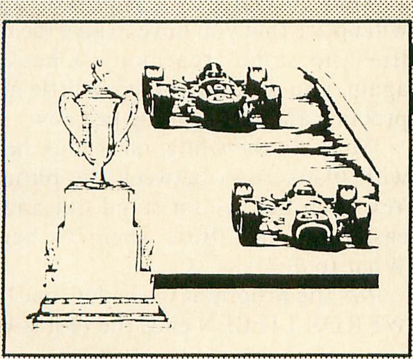


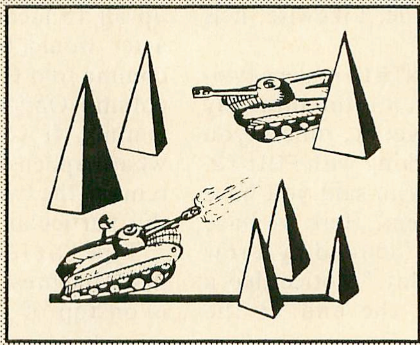
Speed Racer by Steven Hirsch

The checkered flag drops as your pulse rises in this lively new arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for the most exciting race the CoCo has ever seen!

Vie for time as you speed through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but step lively since some will stop at nothing to see the end of the race, or the end of you!

Four challenging raceways, complete with obstacles and colorful 3-D scenery, put your skills to the test in this Pole Position™ type game.

32K Color Computer required. $34.95



Rommel 3-D by Kary McFadden

You clutch the tank controls, searching for any sign of the enemy. Suddenly a blip appears on radar! Frantically, you move your tank into position. At last you spot the elusive enemy tank! Facing it, you race to lock sights and fire before he does!

Enter the ultimate battle-zone in this exciting 3-D tank combat game. Strategy, speed, and your tank's cannon are your only hope as you wind through a three-dimensional course inhabited by impenetrable barriers and enemy tanks.

Dazzling graphics and lifelike sound take you a step beyond the ordinary in this fast, machine-language arcade game. Enter the next dimension, ROMMEL'S troops are waiting for you!

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There seems to be more than one way to do anything. `PRINTTAB` can also be used to create our word list. Key in Line 40. Using `PRINTTAB`, we begin at Location 2, effectively indenting two spaces by putting the '2' within parentheses (2) and within a brace of quotes enter the first phrase. Without further punctuation or delineating marks, key in `TAB` followed by (16) to get us to the seventeenth space in the row. Then within quotes, type in the second phrase.

Recall that the first space at the left margin is `PRINTTAB(0)`. Thus, `PRINT TAB(2)` is really the third space in the row. This is the most satisfying manner to make two-column lists of text.

In lines 41 and 42, the `PRINTTAB` locations are the same as in Line 40 (2 and 16) as would be the locations of any addition lines.

To summarize: If you use the `PRINT TAB` method between the two text phrases enclosed within quote marks that comprise the two columns, insert `TAB(X)`, where 'X' is the desired `PRINT@` location.

For the beginner, this system will do yeoman service. It is readily visualized in the listing and the rows can be speedily realigned horizontally by changing the 'X' value. Likewise, it is simple to edit.

You could use `PRINT@` to make a two-column list, however, it is too unwieldy and confusing. Forget it, unless you want to practice working with `PRINT@`.

Key in Line 50. Who said you have to use only one system? Here we have a row of `PRINTTAB`, followed by a row using the "comma ploy." Notice that a comma follows at the end of the `TAB(16)` entry to tell CoCo to move over to the next column; in this case, the first column in the third row. The third row is put on using the `PRINT` method, wherein we space over with the space bar to pick up the starting location to begin the second column on the row.

Don't you think that instead of `:PRINT` we could have inserted a comma? Try it! Yes, we could, but that creates a new modification. After the first `PRINT` line, as in Line 10, continuing to use the `PRINT` format, you could have added the information in lines 11 and 12, using the comma to start a new row. For practice, rework lines 10-19, using this modification to make a multiple statement program line.

In Line 60, we will compare the present tense, "love," with the future tense, "will love," side by side. We are going to make a single, multiple statement line that separates each phrase with a comma.

Type `NEW` and carefully key in Line 60 and `RUN`. What a mess! But, have no fear, a little editing will put it right.

The first row is properly located. The second row begins over where the second column begins. The reason is that the second column of the first row used up all 16 locations and the next character would be on the new line. The comma told CoCo to go on to the next column. Obviously, we must remove the comma. If you take out the comma, what happens? It is OK. You may also remove the two quotes on either side of this particular comma.

Type `EDIT60` and press ENTER. Type in `45` and press the space bar. The cursor is on top of the comma. Press 'D' to delete it and ENTER to get out of edit mode.

If it is confusing to find LIEBENDU bunched up without a space, put the quotes back in. A newcomer can visualize it easier if the two phrases are separated into separate units.

Now, notice that the fourth row overlaps into the fifth row, causing havoc by pushing over the phrase IHR LIEBT to the next column. We must work within the constraints put upon us by CoCo. We must break up WIR WERDEN LIEBEN and move LIEBEN under WIR WERDEN. Big job? No! Edit Line 60 by inserting between WIR WERDEN and LIEBEN two commas (,,) and remove the blank space. The two commas cause it to move over two columns, just where we want it.

Type `EDIT60`, press ENTER, then type `120` and press the space bar. Tap the space bar a few times so the cursor is between the 'N' and 'L'. Type 'I' to get in the insert mode. Type in two commas and press the up arrow and SHIFT at the same time to get out of insert mode. Press 'D' to get rid of the blank space. Press ENTER to get out of edit mode.

After checking over your work, you will notice that you have to give the next line the same treatment. Checking again, you see that you get a little more practice and ditto on the last row.

Wouldn't the whole mess look better with blank rows between the phrases? Yes, each line would stand out and be easier to read. But, where to begin? What to do?

`RUN` the program. Consider that ICH WERDE LIEBEN ends the first row. If

Listing 1: `GERMAN`

```
0 'LISTING1
10 CLS:PRINT:PRINT"  ICH LIEBE
   WIR LIEBEN"
11 PRINT"  DU LIEBST     IHR LIE
BT"
12 PRINT"  ER LIEBT      SIE LIE
BEN"
19 EXEC44539
20 CLS:PRINT:PRINT"  ICH LIEBE
   WIR LIEBEN":PRINT"  DU LIEBST
     IHR LIEBT":PRINT"  ER LIEBT
      SIE LIEBEN":EXEC44539
30 CLS:PRINT:PRINT"  ICH LIEBE",
"WIR LIEBEN","  DU LIEBST","IHR
LIEBT","  ER LIEBT","SIE LIEBEN"
:EXEC44539
40 CLS:PRINT:PRINTTAB(2)"ICH LIE
BE"TAB(16)"WIR LIEBEN"
41 PRINTTAB(2)"DU LIEBST"TAB(16)
"IHR LIEBT"
42 PRINTTAB(2)"ER LIEBT"TAB(16)"
SIE LIEBEN":EXEC44539
50 CLS:PRINT:PRINTTAB(2)"ICH LIE
BE"TAB(16)"WIR LIEBEN","  DU LIE
BST","IHR LIEBT":PRINT"  ER LIEB
T      SIE LIEBEN":EXEC44539
60 CLS:PRINT:PRINT"ICH LIEBE","I
CH WERDE LIEBEN","DU LIEBST","DU
 WIRST LIEBEN","ER LIEBT","ER WI
RD LIEBEN","WIR LIEBEN","WIR WER
DEN LIEBEN","IHR LIEBT","IHR WER
DET LIEBEN","SIE LIEBEN","SIE WE
RDEN LIEBEN"
```

we put two commas between that phrase and the next, DU LIEBST, that should give us two empty columns; in effect, an empty row.

Type `EDIT60`. If you left in the two quotes, then type `45` and press the space bar, then tap over to get beyond the first quote. Type `I` to get in insert mode, then two commas, and press ENTER to get out of edit. If you yanked the two quotes then type `EDIT60`, type `45` and press the space bar and left arrow to get on top of 'D'. Type `I` to get in insert mode. Type two commas enclosed in quotes (″,,″) and press ENTER to get out of edit mode.

Now `RUN`; check your work by pressing BREAK, type `EDIT60`, type `60` and press the space bar. Advance using the space bar until you are over the comma after LIEBEN. Type `I` to get in insert mode, insert two commas (,,) and press ENTER to get out and `RUN`. See?

Now you may finish up the others one at a time. Remember that you are only adding these blank-line producing commas after the LIEBEN in the second column and not after WERDET or WERDEN.

If you feel confident, `EDIT60`, then type `100` and press the space bar. Tap the space bar until it is on top of the comma after LIEBEN. Now perform the following: Type `I` and two commas, press the up arrow and SHIFT at the same time, space over to the next LIEBEN, (about 35 spaces), type `I` and two commas, press the up arrow and SHIFT together. Tap over to the next work zone. After the third insertion, press ENTER and `RUN`.

I guess we beat that ox to death! Here is the quote for today: "I love you, Mr. CoCo." And your lesson for today? Repeat after me, "Ich liebe dich, Herr CoCo." ☐

Listing 2: `YOYO`

```
0 'YOYO
5 '(C) 1984, J KOLAR
30 PMODE4,1:PCLS
40 A=126:B=90:R=72:PI=1.70
50 DIM S(13)
60 DRAW"BM8,4NU4NL4NR4ND4NE4NF4N
G4NH4"
70 GET(0,0)-(12,10),S,G
80 PCLS:SCREEN1,1
175 FOR S=15 TO 3 STEP-6
180 FORZ=1TO676 STEPS:C=Z
190 C=90+C*PI/180
195 K=R
200 X=INT(A+R*COS(K)):Y=INT(B+R*
SIN(C))
210 PUT(X+80,Y)-(X+68,Y+10),S,PS
ET
213 X=INT(A+R*SIN(C)):Y=INT(B+R*
COS(C))
215 PUT(X-5,Y)-(X+7,Y+10),S,PSET
220 NEXT Z,S
230 PLAY"O3V25L8CV30EV25CO2BABV2
0O3CL16EEFFGGV15EEFFGGL8GFEL4CO2
V20BO3L2C"
240 GOTO175
```

Two-Liner Contest Winner . . .

This program gives you an idea of the enthusiast's affection for the CoCo. Type it in and run it!

The listings:

```
1 PMODE4,1:PCLS:SCREEN1,1:DRAW"B
M106,8;R43D12L43U12D12BD5R42D35G
20H20U35R10D44U44R20D44":CIRCLE(
128,96),6:DRAW"BM109,90;M123,90M
128,77M133,90M148,90M136,99M141,
112M128,103M115,112M120,99M109,9
0":DRAW"BM116,17;G1L4H2U3E2R4F1B
D5R5H1U2E1R2F1D2G1L2BR17G1"
2 DRAW"L4H2U3E2R4F1BD5R5H1U2E1R2
F1D2G1L2":PAINT(115,30),1:PAINT(
145,40),1:PAINT(126,89),1:DIM V(
100,1,1):GET(0,0)-(255,1),V:FORC
=0TO191:PUT(0,C)-(255,C),V,NOT:N
EXTC:FORX=1TO2000:NEXTX:I$=INKEY
$:IFI$="I"THENRUNELSEIFI$=""THEN
RUN:END
```

C.W. Harriman
Bradford, MA

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

E.T.T. Electronic Typing Teacher
by CHERRYSoft

Learning to type the right way can save you hours of tedious work when entering programs into your CoCo, and this is just what ETT was designed to do. Devote a little time every day practicing with ETT and before you know it you will be typing with confidence. Entering those programs will no longer be the chore it use to be.

ETT's video keyboard lets you practice with all the keys labeled, all the keys blank or only the "home" keys labeled. The visual cues guide you while you learn to type without watching your fingers. ETT shows your accuracy, response time, and words per minute. You will quickly see that you are improving with practice.

With the sentences provided by ETT learning to type can be fun. Over 1000 variations chosen because they include every letter in the alphabet. You can also create your own practice sets. This outstanding program was written by a certified teacher and professional programmer and comes with a ten page student manual-study guide. Requires 16K Extended Basic.

Cassette $24.95 FREE SHIPPING Disk $29.95

ETT is being used in schools throughout the U.S.
See ETT at your favorite dealer or order direct.
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Sugar Software

Proven effective against the popular CoCo piracy-cracking copy programs

Tired of the same old utilities?

Would you like to protect your disk software from unauthorized copying, but still allow your users to make back up copies? Then

PIRATECTOR!™

is for you!

$99.95 - Disk

Don't waste your valuable time and effort concocting anti-piracy schemes. Spend your time developing new programs and then Piratect™ them. Piratector will protect your Basic or ML programs using many different sophisticated techniques, while still allowing your users to create (non-executable) backups that can be used to recover a "crashed" master disk.

Piratector offers much more than just software protection. Several ML utilities are provided including:

COMBINER -	appends ML subroutines with your Basic program.
SEMIGRAF -	full featured high-resolution 8 color semigraphic graphic editor to build title screens for your programs.
GETLIN -	keyboard input subroutine for easy development of MENU oriented software (Basic or ML)

PIRATECTOR features:

- Protects Basic or ML programs
  - — Encryption
  - — ML AUTO Loader
  - — Basic Break Disabler
  - — Error catcher
  - — Reset Button Disable
- Utility subroutines included
- Automate your duplication if multiple drives are used
- Each copy will be "finger printed" with incrementing serial numbers

SEMIGRAF
Graphics Editor

Tape - $19.95
Disk - $24.95

- Graphics editor to create and modify your own pictures
- Pictures can be used as a title screen for a program
- Create a series of pictures to make a slide show
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- Requires 16K

$19.95

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- Create "slide shows" with a series of title screens
- Used by many CoCo software houses
- Requires 16K ECB

Dealer and author inquiries are always welcome. Canadian dealers should contact Kelly Software Distributors, Ltd., P.O. Box 11932, Edmonton, Alberta T5J-3L1, (403) 421-8003.
Disk software compatible with Radio Shack DOS only.

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Hollywood, Florida 33021
(305) 981-1241

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Add $1.50 per program for postage and handling. Florida residents add 5% sales tax. COD orders are welcome. CIS orders EMAIL to 70405, 1374. **No refunds or exchanges.**

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Sugar Software

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Use your CoCo, your 8-bit dot addressable graphics printer and the **CoCo Calligrapher** to create beautiful signs, invitations, flyers, greeting cards, diplomas, certificates, awards and love letters.

The original **Calligrapher** letters are 36 points (1/2 inch) high and variably spaced. It includes an easy-to-use, menu-oriented program and these three typestyles:

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Old English Cartoon

Gay Nineties

Gay Nineties

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These tapes of additional typestyles are available for **$19.95 each**. They can be easily moved to disk. ***The original Calligrapher program is required.***

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Old English **Gay Nineties** **Cartoon**

uvwxynoldsbabcde

All typestyles on Tapes 2, 3, 4, 5, and 6 include Standard (1/2 inch), Reversed, Reduced, and Reduced-Reversed unless otherwise noted.

Tape 2: Broadway/Old Style

Broadway Oldstyle

Tape 3: Business/Antique

Business Antique

*These disks of additional typestyles are available for **$49.95** each.*

Disk 1 - all type styles on Tapes 1, 2 and 3.
Disk 2 - all type styles on Tapes 4, 5 and 6.

Tape 4: Wild West/Checkers

Wild West Checkers

Tape 5: Star **Hebrew**

Stars שלום

Victorian (Standard and Reverse only)

Victorian

Tape 6: Block/Computer

Block
COMPUTER

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$39.95

Requires OS-9 Version 01.01.00 and a dot matrix printer. **The OS-9 Calligrapher** reads a standard input text file which contains text and formatting directives to produce standard utput for printer or disk. You can specify which font to use; centering; left, right or full justification; line fill; narrow mode; margin; line width; page size; page break and indentation.

*These disks of additional typestyles are available for **$49.95** each.* They are not compatible with the **CoCo Calligrapher** typestyles or program. OS-9 typestyle disk must be used with the **OS-9 Calligrapher**.

Disk 1 - OS-9 version of all type styles on Tapes 1, 2 and 3.

Disk 2 - OS-9 version of all type styles on Tapes 4, 5 and 6.

Dealer and author inquiries are always welcome. Canadian dealers should contact Kelly Software Distributors, Ltd., P.O. Box 11932, Edmonton, Alberta T5J-3L1, (403) 421-8003.
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P. O. Box 14806
Jacksonville, FL 32238
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Not a dance, but a disk alignment aid . . .

Doing the Disk-O-Step

By Dave Trapasso

If you've ever tried to do a disk alignment, you know it is necessary to have complete control over the drive on which you are working. This means being able to go to a selected track at will, and being able to turn the drive motor on and off.

The problem with using most other disk zapper-type utilities results from the fact that they actually try to read the data from the disk. If there is a problem with the disk, such as alignment, the utility generates an error and gives up, or keeps stepping back to track zero then to the track in order to retry reading it.

This is not very helpful while trying to keep the motor on and the head still at the track you are checking. This utility, *Disk-O-Step*, lets you do just that. As a matter of fact, you can use most of the functions of the utility without a disk in the drive and with the door open!

Since this is the age of electronic information storage, rather than print the instructions they are included in the program. This means you will never lose them and have to hunt through all your manuals or back issues of THE RAINBOW to find the instructions to the program.

Disk-O-Step is very simple to use and is menu driven. As a bonus, the program even includes a disk speed test. Note that the program is fully commented for debugging and for any changes you wish to make. Example: Look at lines 80, 90 and 100. You may want to change the maximum number of tracks or the step rate to suit the drive with which you are working. Only 16K of memory is required, provided that you `PCLEAR 1` before loading the program. More than 16K of memory does not require any changes. Of course, Disk BASIC is required.

So, "step out" and have a good time. ☐

190	132	2250	84
410	7	2400	226
610	179	2560	60
820	254	2710	52
1010	174	2860	1
1190	108	3020	148
1360	238	3170	177
1540	95	3320	133
1730	41	3480	49
1930	255	3630	187
2080	55	END	58

The listing: DISKSTEP

```
10 PCLEAR 1: CLEAR 500,&H4FBF
20 FOR I=&H4FC0 TO &H4FE3 'POKE
IN MACHINE CODE FOR DISK SPEED T
EST
30 READ D$
40 POKE I,VAL("&H"+D$)
50 NEXT I
60 CLS 4
70 RES=3 'OP CODE FOR RESTORE CO
MMAND
80 SI=&H50 'OP CODE FOR STEP IN
@ 6MS, USE &H53 FOR 30MS
90 SO=&H70 'OP CODE FOR STEP OUT
 @ 6MS, USE &H73 FOR 30MS
100 MAX=34 'MAX # OF TRACKS
110 C=&H29 ' SELECT DRIVE 0, DOU
```

```
BLE DENSITY
120 DN=0 ' DRIVE NUMBER 0
130 MS=0 ' MOTOR STATUS= OFF
140 TRK=&HFF49 'FLOPPY DISK TRAC
K REGISTER
150 COM =&HFF48 'FLOPPY DISK COM
MAND & STATUS REGISTER
160 DRV=&HFF40 'FLOPPY DISK SELE
CT REGISTER
170 PRINT @231,"disk alignment a
id";
180 PRINT @260,"WRITTEN BY- DAVE
 TRAPASSO";
190 PRINT @297,"OCTOBER, 1984";
200 PRINT @448, "WOULD YOU LIKE
INSTRUCTIONS";
210 Z$=INKEY$ :IF Z$="" THEN 210
220 IF Z$="Y" THEN GOSUB 1970
230 CLS
240 GOSUB 780 'RESTORE DRIVE 0 T
O TRACK 0
250 PRINT @0,"TOGGLE MOTOR ON/OF
F= M"
260 PRINT "RESTORE TO TRACK 0= R
"
270 PRINT "0 TO 3= SELECT DRIVE
#"
280 PRINT "STEP DRIVE IN= I"
290 PRINT "STEP DRIVE OUT= O"
300 PRINT "GOTO TO TRACK= G"
310 PRINT "READ TRACK'S SECTOR I
N HEX= H"
320 PRINT "READ TRACK'S SECTOR I
N ASCII= A"
330 PRINT "MOTOR SPEED TEST= S"
340 PRINT "COMMAND:"
350 PRINT @384, "track zero swit
ch"
360 PRINT @416,"motor"
370 PRINT @448, "drive #"
380 PRINT @480, "track #";
390 '*KEYBOARD INPUT ROUTINE*
400 POKE 339,2 'KEY REPEAT THE '
I' KEY
410 POKE 345,2 'KEY REPEAT"THE '
O' KEY
420 POKE DRV,C
430 CK=PEEK(COM) AND 4
440 IF NOT MS THEN POKE DRV,0 'I
F MOTOR STATUS OFF, SHUT OFF MOT
ORS
450 IF CK=4 THEN PRINT @402,"ON
" ELSE PRINT @402,"OFF"
460 IF MS THEN PRINT @422,"ON ";
 ELSE PRINT @422,"OFF";
470 TK=PEEK(TRK) 'FIND OUT WHAT
TRACK ALOPPY CONTROLLER THINKS W
E'RE AT
480 PRINT @488,TK;"   ";
490 POKE &H97E,TK ' TELL DOS WHA
T TRACK WE ARE AT FOR EACH DRIVE
500 POKE &H97F,TK
510 POKE &H980,TK
520 POKE &H981,TK
530 PRINT @456,DN;
540 C$=INKEY$
550 IF C$="0" THEN 700
560 IF C$="1" THEN 700
570 IF C$="2" THEN 700
580 IF C$="3" THEN 700
590 IF C$="R" THEN 750
600 IF C$="I" THEN 950
610 IF C$="O" THEN 1010
620 IF C$="G" THEN 1110
630 IF C$="S" THEN 1810
640 IF C$="H" THEN 1320
650 IF C$="A" THEN 1610
660 IF C$<>"M" THEN 540
670 '*CHANGE MOTOR STATUS*
680 MS= NOT MS
690 GOTO 420
700 DN=VAL(C$) ' GET NUMERICAL V
ALUE OF DRIVE NUMBER SELECTED
710 IF DN=0 THEN C=&H29 'CODE FO
R DRIVE 0 SELECT
720 IF DN=1 THEN C=&H2A 'CODE FO
R DRIVE 1 SELECT
730 IF DN=2 THEN C=&H2C 'CODE FO
R DRIVE 2 SELECT
740 IF DN=3 THEN C=&H68 'CODE FO
R DRIVE 3 SELECT
750 GOSUB 770 'RESTORE THE SELCT
ED DRIVE TO TRACK 0
760 GOTO 420
770 '*THIS SUB RESTORES CURRENT
DRIVE TO TRACK 0*
780 GOSUB 1070 'TURN ON DRIVE &
WAIT FOR IT TO SPEED UP
790 POKE COM,RES 'ISSUE RESTORE
COMMAND TO CONTROLLER
800 FOR I= 0 TO 100 'LOOK FOR TR
ACK 0 SWITCH THIS MANY TIMES
810 CK=PEEK(COM) AND 4 'READ TRA
CK ZERO SWITCH
820 IF CK=4 THEN 900 'IF ON THEN
 WE ARE DONE
830 NEXT I 'CHECK SWITCH AGAIN
840 PRINT @320,"DRIVE? PUSH ENTE
R"
850 A$=INKEY$
860 IF A$="" THEN 850
870 IF A$<>CHR$(13) THEN 60
880 GOSUB 1280 'CLEAR THE INPUT
LINE
890 GOTO 780 'TRY TO RESTORE AGA
IN
```

```
900 MS=0
910 IF PEEK(TRK)<> 0 THEN 830
920 CK=PEEK(COM) AND 4
930 IF CK=0 THEN 830
940 RETURN
950 '*THIS STEPS THE DRIVE IN*
960 IF TK=MAX THEN 390 'IF WE AR
E ALL THE WAY IN, THEN DON'T DAM
AGE DRIVE
970 IF MS THEN 990 'IF MOTOR IS
ALREADY ON, LET'S SPEED THINGS U
P
980 GOSUB 1070 'TURN ON SELECTED
 MOTOR
990 POKE COM,SI 'ISSUE STEP IN C
OMMAND TO CONTROLLER
1000 GOTO 390
1010 '*THIS STEPS THE DRIVE OUT*
1020 IF TK=0 THEN 420 'IF WE ARE
 ALL THE WAY OUT, THEN DON'T DAM
AGE DRIVE
1030 IF MS THEN 1050 'IF MOTOR I
S ON, THEN LET'S SPEED THINGS UP
1040 GOSUB 1070
1050 POKE COM,SO 'ISSUE STEP OUT
 COMMAND TO CONTROLLER
1060 GOTO 390
1070 POKE DRV,C 'SELECT DRIVE &
TURN ON MOTORS
1080 FOR I= 1 TO 50 'DELAY FOR M
OTORS TO COME UP TO SPEED
1090 NEXT I
1100 RETURN
1110 '*THIS STEPS TO THE SELECTE
D TRACK*
1120 PRINT @320,"input track # "
;
1130 INPUT TK$
1140 T=VAL(TK$) 'GET NUMERIC VAL
UE OF INPUT TRACK NUMBER
1150 GOSUB 1280 'CLEAR THE INPUT
 LINE
1160 IF T<0 THEN 1110 'CHECK FOR
 ILLEGAL VALUES
1170 IF T>MAX THEN 1120
1180 M=MS 'SAVE PRESENT MOTOR ST
ATUS, RESTORE WILL TURN IT OFF
1190 GOSUB 770 'NOW RESTORE TO T
RACK 0
1200 MS=M 'PUT BACK ORIGINAL MOT
OR STATUS
1210 GOSUB 1070 'TURN ON DRIVE M
OTORS
1220 IF T=0 THEN 390 'IF THEY WA
NTED TRACK ZERO, WE ARE THERE
1230 FOR I=1 TO T 'STEP IN ONCE
FOR EVERY TRACK NUMBER
1240 POKE COM,SI 'ISSUE STEP IN
COMMAND TO CONTROLLER
1250 IF PEEK(COM) AND 1 THEN 125
0 'SEE IF COMPLETE
1260 NEXT I
1270 GOTO 420
1280 '*THIS SUB. CLEARS THE INPU
T LINE*
1290 PRINT @320,"
                ";
1300 PRINT @352,"
                ";
1310 RETURN
1320 '*THIS DISPLAYS SECTOR FROM
 CURRENT DRIVE & TRACK IN HEX*
1330 GOSUB 1480 'INPUT SECTOR NU
MBER, & READ IT
1340 P=1024
1350 GOSUB 1390 'SHOW 1/2 OF SEC
TOR IN HEX
1360 A$=B$ 'SET UP TO SHOW 2ND H
ALF IN HEX
1370 GOSUB 1390 'SHOW OTHER 1/2
IN HEX
1380 GOTO 1580 'WAIT FOR INPUT T
O RESUME
1390 FOR I = 1 TO  128 'LENGTH O
F 1/2 OF SECTOR
1400 H=ASC(MID$(A$,I,1)) 'MAKE H
EX CHAR. OF EACH
1410 HL=INT(H/16) :HR=H-HL*16
1420 HL=HL+55 :IF HL<65 THEN HL=
HL+57
1430 HR=HR+55 :IF HR<65 THEN HR=
HR+57
1440 POKE P,HL :POKE P+1,HR
1450 P=P+2
1460 NEXT I
1470 RETURN
1480 '*THIS READS THE SECTOR INP
UT, FROM THE CURRENT DRIVE & TRA
CK*
1490 PRINT @320,"input sector #
(1-18)";
1500 INPUT SN$
1510 SN=VAL(SN$) 'GET NUMERIC VA
LUE OF SECTOR # INPUT
1520 GOSUB 1280 'CLEAR THE INPUT
 LINE
1530 IF SN<1 THEN 1480 'SEE IF I
T'S A LEGAL VALUE
1540 IF SN>18 THEN 1480
1550 DSKI$ DN,TK,SN,A$,B$ 'READ
SECTOR FROM DISK INTO A$ & B$
1560 CLS
1570 RETURN
1580 IF INKEY$="" THEN 1580
1590 CLS
1600 GOTO 250
```

```
1610 '*THIS DISPLAYS SECTOR FOR
CURRENT DRIVE & TRACK IN ASCII*
1620 GOSUB 1480 'INPUT SECTOR NU
MBER, & READ IT
1630 N=1
1640 FOR I=0 TO 15 'SHOW THIS MA
NY LINES OF ASCII
1650 AD=I+48 'SHOW HEX ADDRESS O
F EACH"LINE, MAKE IT ASCII
1660 IF AD> 57 THEN AD=AD+7 'COR
RECT ASCII FOR HEX 'A-F'
1670 PRINT @(32*I),CHR$(AD);"0=
"; 'NOW PRINT ADDRESS ON LINE
1680 FOR P=N TO N+15 'SHOW THIS
MANY CHARS/LINE
1690 Z$=MID$(A$,P,1) 'GET CHARS
ONE AT A TIME
1700 IF Z$="" THEN Z$="." 'CHECK
 FOR UNPRINTABLE CHARS.
1710 IF ASC(Z$)>&H7F THEN Z$="."
1720 IF ASC(Z$)<&H20 THEN Z$="."
1730 PRINT Z$; 'NOW SHOW CHAR. O
N SCREEN
1740 NEXT P
1750 N=P 'UNDATE CHAR. POINTER F
OR NEXT LINE
1760 IF N< 128 THEN 1790 'CHECK
FOR SECOND 1/2 OF SECTOR
1770 N=1 'SECOND 1/2, RESET CHAR
. POINTER
1780 A$=B$ 'SET UP TO SHOW 2ND 1
/2 OF SECTOR
1790 NEXT I
1800 GOTO 1580
1810 CLS 3
1820 GOSUB 1070
1830 PRINT @228,"MOTOR SPEED=";
1840 POKE COM,RES
1850 EXEC &H4FC0
1860 T=256*PEEK(&H4FE4)+PEEK(&H4
FE5)
1870 IF T<>0 THEN 1900
1880 RPM=0
1890 GOTO 1910
1900 RPM=(5600/T)*300
1910 IF INKEY$<>"" THEN 1590
1920 PRINT @240,"";
1930 PRINT USING "###.# ";RPM;
1940 PRINT " RPM  ";
1950 GOTO 1850
1960 DATA 34,12,8E,0,0,B6,FF,48,
30,1,27,12,84,2,26,F5,8E,0,0,B6,
FF,48,30,1,27,4,84,2,27,F5,AF,8D
,0,2,35,92
1970 CLS: PRINT "THE 'M' KEY WIL
L TURN THE MOTORS";
1980 PRINT "ON OR OFF. IF PUSHED
 WHILE THE"
1990 PRINT "MOTORS ARE ON, THEY
WILL SHUT"
2000 PRINT "OFF & VICE-VERSA. AN
Y MENU ITEM"
2010 PRINT "MAY BE SELECTED WITH
 THE MOTORS"
2020 PRINT "IN EITHER STATE. IF
AN ITEM IS"
2030 PRINT "SELECTED WITH THE MO
TOR OFF, THE";
2040 PRINT "COMMAND WILL TURN ON
 THE MOTORS,";
2050 PRINT "EXECUTE, & TURN IT B
ACK OFF. IF"
2060 PRINT "THE MOTOR IS ON, IT
WILL STAY ON";
2070 PRINT "AFTER THE COMMAND EX
ECUTES,"
2080 PRINT "EXCEPT FOR THE RESTO
RE COMMAND"
2090 PRINT "WHICH WILL ALWAYS SH
UT THE"
2100 PRINT "MOTOR OFF AFTER IT I
S DONE."
2110 GOSUB 3860
2120 PRINT "THE 'R' KEY WILL RES
TORE THE"
```

Canadians

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TEN MOST-ASKED QUESTIONS
about DYNACALC®
THE ELECTRONIC SPREAD-SHEET FOR OS-9 SYSTEMS

---

1. What is an electronic spread-sheet, anyway?
Business people uses spread-sheets to organize columns and rows of figures. DYNACALC simulates the operation of a spread-sheet without the mess of paper and pencil. Of course, corrections and changes are a snap. Changing any entered value causes the whole spread-sheet to be re-calculated based on the new constants. This means that you can play, 'WHAT IF?' to your heart's content.

2. Is DYNACALC just for accountants, then?
Not at all. DYNACALC can be used for just about any type of job. Not only numbers, but alphanumeric messages can be handled. Engineers and other technical users will love DYNACALC's fifteen-digit math and built-in scientific functions. With 6809 DYNACALC, you can build worksheets as large as 256 columns or 256 rows (18278 columns or 9999 rows in 68000 versions). There's even a built-in sort command, so you could use DYNACALC to manage small data bases — each row of the worksheet is one record.

3. What will DYNACALC do for ME?
That's a good question. Basically the answer is that DYNACALC will let your computer do just about anything you can imagine. Ask your friends who have Lotus 1-2-3, VisiCalc, or similar programs, just how useful an electronic spread-sheet program can be for all types of household, business, engineering, and scientific applications.

4. Do I have to learn computer programming?
NO! DYNACALC is designed to be used by non-programmers, but even a Ph.D. in Computer Science can understand it. Built-in HELP messages are provided for quick reference to operating instructions.

5. Do I have to modify my system to use DYNACALC?
Nope. DYNACALC uses any standard OS-9 configuration, so you don't have to spend money on another CPU board or waste time learning another operating system.

6. Will DYNACALC read my existing data files?
You bet! DYNACALC has a beautifully simple method of reading and writing data files, so you can communicate both ways with other programs on your system, such as the Stylo-Graph word processor, Sort/Merge, data base systems, or other programs written in Basic09, C, PASCAL, FORTRAN, and so on.

7. How fast is DYNACALC?
Very. DYNACALC is memory-resident, so there is no disk I/O to slow things down. The whole data array (worksheet) is in memory, so access to any point is instantanious. DYNACALC is 100% machine code for blistering speed.

8. Is there a version of DYNACALC for MY system?
There's a version of DYNACALC for EVERY OS-9 system. Unless you have a CoCo, you need a CRT terminal with at least 80 characters per line, and direct cursor addressing. You can mix different brands of terminal on the the same system. The CoCo OS-9 version is compatible with 80-column hardware cards, or will work with the standard 32x16 screen.

9. How much does DYNACALC cost?
Radio Shack sells the CoCo OS-9 version for $99.95. The general 6809 OS-9 version is priced at $250; $595 for the OS-9/68k version. Foreign orders add $10 per copy for postage. We encourage dealers to handle DYNACALC since it's a product that sells instantly upon demonstration. Call or write on your company letterhead for more information.

10. Where do I order DYNACALC?
If you have a CoCo, order # 26-3275 at your local Radio Shack store. Otherwise, see your local DYNACALC dealer, or order directly from CSC at the address below. We accept telephone orders from 10 am to 6 pm, Monday through Friday. Call us at 314-576-5020. Your VISA or MasterCard is welcome. All orders are shipped on 5" diskette unless you specify otherwise. Please tell us if you need Microware (standard) or Mizar format.

Computer Systems Center
42 Four Seasons Center #122
Chesterfield, MO 63017 USA
(314) 576-5020

CSC

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DYNACALC ♥ OS-9

```
2130 PRINT "THE HEAD OF THE CURR
ENT DRIVE TO";
2140 PRINT "TRACK 0. THE RESTORE
 COMMAND"
2150 PRINT "WANTS THE TRACK 0 SW
ITCH TURNED"
2160 PRINT "ON. IF AFTER AN ALLO
TTED AMOUNT"
2170 PRINT "OF TIME, THE SWITCH
DOES NOT, A"
2180 PRINT "'DRIVE ?' MESSAGE AP
PEARS. THIS"
2190 PRINT "OCCURS IF THE DRIVE
IS NON-"
2200 PRINT "EXISTENT OR SLOW. PU
SHING ENTER"
2210 PRINT "WILL TRY TO RESTORE
AGAIN, WHILE";
2220 PRINT "ANY OTHER KEY WILL R
ESTART THE"
2230 PRINT "PROGRAM."
2240 GOSUB 3860
2250 PRINT "ENTERING A '0 TO 3'
WILL SELECT"
2260 PRINT "THE DRIVE # THAT YOU
 WANT TO"
2270 PRINT "WORK WITH. SELECTING
 A DRIVE"
2280 PRINT "WILL AUTOMATICALLY R
ESTORE THE"
2290 PRINT "DRIVE TO TRACK 0, SO
 THAT THE"
2300 PRINT "PROGRAM WILL KNOW WH
ERE THE HEAD";
2310 PRINT "IS ACTUALLY POSTITIO
NED."
2320 GOSUB 3860
2330 PRINT "THE 'I' COMMAND STEP
S THE DRIVE"
2340 PRINT "IN 1 TRACK, (MOVES T
HE HEAD ONE"
2350 PRINT "TRACK TOWARD THE CEN
TER HOLE OF"
2360 PRINT "THE DISK). THE 'O' C
OMMAND STEPS";
2370 PRINT "THE DRIVE OUT 1 TRAC
K. BOTH KEYS";
2380 PRINT "AUTOMATICALLY REPEAT
 IF HELD"
2390 PRINT "DOWN. IF THE MOTORS
ARE ON"
2400 PRINT "BEFORE EITHER KEY IS
 HELD DOWN,"
2410 PRINT "THE DRIVES WILL STEP
 MUCH"
2420 PRINT "FASTER SINCE THE PRO
GRAM DOESN'T";
2430 PRINT "HAVE TO WAIT FOR THE
 MOTORS TO"
2440 PRINT "COME UP TO SPEED BEF
ORE IT"
2450 PRINT "STEPS." :GOSUB 3860
2460 PRINT "THE 'G' COMMAND WILL
"
2470 PRINT "AUTOMATICALLY STEP T
HE DRIVE TO"
2480 PRINT "THE DESIRED TRACK #
ENTERED. THE";
2490 PRINT "COMMAND ACTUALLY RES
TORES THE"
2500 PRINT "DRIVE TO TRACK 0, TH
EN STEPS IN"
2510 PRINT "ONCE FOR EVERY TRACK
 #. IT WILL"
2520 PRINT "LEAVE THE MOTOR ON/O
FF STATUS"
2530 PRINT "UNCHANGED." :GOSUB 3
860
2540 PRINT "THE 'H' COMMAND WILL
 ACTUALLY"
2550 PRINT "READ THE DATA FROM T
HE CURRENT"
2560 PRINT "TRACK #, FOR THE SEC
TOR ENTERED.";
2570 PRINT "IT WILL DISPLAY THE
DATA IN HEX-";
2580 PRINT "ADECIMAL NOTATION. D
UE TO THE"
2590 PRINT "LIMITED SIZE OF THE
SCREEN, 256"
2600 PRINT "BYTES OF DATA (1 SEC
TOR), WILL"
2610 PRINT "JUST FIT ON THE SCRE
EN AT ONCE,"
2620 PRINT "BUT THIS MEANT LEAVI
NG OUT ALL"
2630 PRINT "THE SPACES & ADDRESS
 INFORMATION";
2640 PRINT "HOWEVER, THERE ARE 1
6 BYTES OF"
2650 PRINT "DATA/LINE. BY COUNTI
NG LINES,"
2660 PRINT "YOU CAN TELL WHICH R
ELATIVE BYTE";
2670 PRINT "# YOU ARE LOOKING AT
```

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```
."
2680 GOSUB 3860
2690 PRINT "THE 'A' COMMAND IS S
IMILAR TO"
2700 PRINT "THE 'H' COMMAND, & W
ILL READ A"
2710 PRINT "SECTOR AND DISPLAY I
T IN ASCII."
2720 PRINT "UNPRINTABLE CHARS. A
RE SHOWN AS"
2730 PRINT "A '.' THE COLUMN ON
THE LEFT"
2740 PRINT "SHOWS THE RELATIVE B
YTE # OF THE";
2750 PRINT "FIRST CHAR. IN THAT
ROW. THE 'A'";
2760 PRINT "COMMAND ALSO SHOWS 1
6 BYTES OF"
2770 PRINT "DATA/LINE." :GOSUB 3
860
2780 PRINT "caution: DO NOT USE
EITHER THE"
2790 PRINT "'A' OR 'H' COMMAND U
NLESS THE"
2800 PRINT "DRIVE IS AT LEAST SO
MEWHAT"
2810 PRINT "ALIGNED, & CAPABLE O
F READING"
2820 PRINT "DATA. THE PROGRAM US
ES THE DSKI$";
2830 PRINT "BASIC STATEMENT TO R
EAD THE"
2840 PRINT "SECTOR FROM DISK. TR
YING TO READ";
2850 PRINT "FROM A DRIVE, UNABLE
 TO READ"
2860 PRINT "SECTORS, WILL RESULT
 IN AN I/O"
2870 PRINT "ERROR. BOTH THE 'A'
& 'H'"
2880 PRINT "COMMANDS WERE INCLUD
ED AS AN AID";
2890 PRINT "TO THOSE THAT DON'T
HAVE AN"
2900 PRINT "OSCILLISCOPE AND/OR
AN ALIGNMENT";
2910 PRINT "DISK." :GOSUB 3860
2920 PRINT "THEY WILL LET YOU VE
RIFY THAT"
2930 PRINT "THE HEAD IS ACTUALLY
 POSITIONED"
2940 PRINT "OVER THE SAME TRACK
THAT THE"
2950 PRINT "DISK CONTROLLER THIN
KS IT'S AT."
2960 PRINT "(TRACK 0 SWITCH ADJU
STMENT. THE"
2970 PRINT "TRACK ZERO SWITCH ST
ATUS IS"
2980 PRINT "SHOWN FOR THIS REASO
N.)"
2990 PRINT "FOR EXAMPLE, STEP TO
 TRACK 17, &";
3000 PRINT "READ SECTOR 3 USING
THE 'A'"
3010 PRINT "COMMAND. THIS IS PAR
T OF THE"
3020 PRINT "DIRECTORY. IF THE NA
MES OF THE"
3030 PRINT "FILES STORED ON THE
DISK DON'T"
3040 PRINT "APPEAR, THEN THERE I
S A PROBLEM.";
3050 GOSUB 3860
3060 PRINT "THE OBJECT OF THE TR
ACK 0 ADJUST";
3070 PRINT "IS TO FIND OUT WHERE
 THEY DISK"
3080 PRINT "CONTROLLER THINKS TH
E HEAD IS AT";
3090 PRINT "VS WHERE IT IS PHYSI
CALLY AT."
3100 PRINT "UPON STARTUP, DOS DO
ES A RESTORE";
3110 PRINT "TO GET IT'S REFERENC
E POINT. NOW";
3120 PRINT "BY COUNTING THE # OF
 TRACKS IT"
3130 PRINT "STEPS IN OR OUT, IT
SHOULD KNOW"
3140 PRINT "WHAT TRACK IT IS AT.
 IF THE"
3150 PRINT "SWITCH TURNS ON SAY
AT TRACK 1,"
3160 PRINT "THE CONTROLLER GETS
FOOLED &"
3170 PRINT "WHEN IT STEPS IN 17
TIMES TO"
3180 PRINT "READ THE DIRECTORY,
IT ACTUALLY"
3190 PRINT "IS AT TRACK 18. THE
RESULT IS AN";
3200 PRINT "I/O ERROR." :GOSUB 3
860
3210 PRINT "THE ACTUAL TRACK & S
ECTOR #'S"
3220 PRINT "ARE WRITTEN ONTO THE
 DISK DURING";
3230 PRINT "THE FORMATTING PROCE
SS. IF THE"
3240 PRINT "TRACK NUMBER READ IS
 NOT THE"
3250 PRINT "SAME AS THE ONE IT T
HINKS IT'S"
3260 PRINT "AT FROM THE TRACK 0
SWITCH, DOS"
3270 PRINT "KNOWS SOMETHING IS W
RONG."
```

```
3280 PRINT "DOS WILL TRY TO REST
ORE SEVERAL"
3290 PRINT "TIMES TO PROPERLY PI
CK UP THE"
3300 PRINT "TRACK 0 SWITCH BEFOR
E DECIDING"
3310 PRINT "TO GENERATE AN I/O E
RROR."
3320 PRINT "THIS IS THE EXTRA CL
UNKING SOUND";
3330 PRINT "THAT IS SOMETIMES HE
ARD AFTER"
3340 PRINT "YOUR SYSTEM IS FIRST
 TURNED ON"
3350 PRINT "WHEN YOU DO A DISK A
CCESS.";
3360 GOSUB 3860
3370 PRINT "THE OBJECT OF AN ALI
GNMENT TEST"
3380 PRINT "IS TO FIND OUT HOW T
HE HEAD IS"
3390 PRINT "FINELY POSITIONED WI
THIN THE"
3400 PRINT "TRACK. FACTORY WRITT
EN DISKETTES";
3410 PRINT "SHOULD HAVE THE TRAC
KS WRITTEN"
3420 PRINT "AT FAIRLY CLOSE TO T
HE IDEAL"
3430 PRINT "LOCATION. IF YOUR DR
IVE IS OUT"
3440 PRINT "OF ALIGNMENT, YOU MA
Y NOT KNOW"
3450 PRINT "IT TILL YOU TRY TO R
EAD & WRITE"
3460 PRINT "A DISKETTE FROM ANOT
HER DRIVE, &";
3470 PRINT "FIND I/O ERRORS OR M
ULTIPLE"
3480 PRINT "RESTORES WHILE DOS T
RYS TO"
3490 PRINT "PERFORM IT'S OPERATI
ON."
3500 GOSUB 3860
3510 PRINT "TO CHECK THE TRACK 0
 ALIGNMENT,"
3520 PRINT "USE THE 'G' COMMAND
TO GO TO"
3530 PRINT "TRACK 17 (THE DIRECT
ORY). USE"
3540 PRINT "THE 'A' COMMAND TO R
EAD SECTOR 3";
3550 PRINT "THE DRIVE SHOULD BE
ABLE TO READ";
3560 PRINT "THE SECTOR with out
moving the"
3570 PRINT "head, AND THE NAMES
OF THE FILES";
3580 PRINT "STORED ON THE DISK S
HOULD APPEAR";
3590 PRINT "ON THE SCREEN. USE A
 WRITE"
3600 PRINT "PROTECTED, STANDARD
TRDOS FORMAT";
3610 PRINT "FACTORY WRITTEN DISK
ETTE FOR"
3620 PRINT "BOTH THE ALIGNMENT &
 TRACK 0"
3630 PRINT "TESTS." :GOSUB 3860
3640 PRINT "IF THE DRIVE RESTORE
S & TRYS TO"
3650 PRINT "READ AGAIN, & THEN S
UCEEDS,"
3660 PRINT "THIS COULD BE AN IND
ICATION OF"
3670 PRINT "AN ALIGNMENT OR DIRT
Y HEAD"
3680 PRINT "PROBLEM. IF IT FAILS
 ALTOGETHER,";
3690 PRINT "TRSDOS WILL GENERATE
 AN I/O"
3700 PRINT "ERROR. THIS COULD BE
 A VERY BAD"
3710 PRINT "ALIGNMENT OR BAD TRA
CK 0 ADJUST."
3720 GOSUB 3860
3730 PRINT "THE FINAL TEST IS TH
E DISK"
3740 PRINT "SPEED TEST. USE THE
'S' COMMAND"
3750 PRINT "TO MEASURE IT. THE S
PEED SHOULD"
3760 PRINT "BE 300.0 +/- 2 RPM.
THERE IS AN"
3770 PRINT "ADJUSTMENT POTENTIOM
ETER INSIDE"
3780 PRINT "THE DRIVE. A MACHINE
 LANGUAGE"
3790 PRINT "PROGRAM MEASURES THE
 TIME IT"
3800 PRINT "TAKES FOR THE INDEX
HOLE IN THE"
3810 PRINT "DISK TO PASS BY, (1
REVOLUTION)"
3820 PRINT "AND THE PROGRAM DISP
LAYS THE"
3830 PRINT "SPEED CONTINUALLY ON
 THE SCREEN.";
3840 PRINT "HOLD DOWN ANY KEY TO
 TERMINATE"
3850 PRINT "THE TEST & RETURN TO
 THE MENU."
3860 PRINT @ 480, "HIT ANY KEY T
O CONTINUE";
3870 IF INKEY$ ="" THEN 3870
3880 CLS :RETURN
```

Here's a database program that, as the author says, "shows the wisdom of the 'point and press' user environment."

Julie 'The Mouse'

By Stephen P. Clark

About seven years ago I saw the Xerox Star and decided I needed one. Forget about typing "CONTROL-R-shift-*-slash" to get a computer to perform some function, just roll the little mouse around. With a little hand-eye coordination I could see that when the mouse moved left, the arrow on the screen also moved left. Press the button and whatever the arrow is pointing to is called to action.

I went back to my keyboard and typed away with the consolation that I couldn't afford a Star. "Control-R-escape!" Then Apple brought out the Lisa computer, complete with mouse. I couldn't afford that either. Then Apple introduced the Macintosh and mouse; more affordable, but I already had a Radio Shack Color Computer and lots of programs I had spent months getting used to.

Then I read that Radio Shack had introduced a mouse for the Color Computer. Since I had the computer, all I needed was the mouse. I dashed off to the nearest Radio Shack and looked at it. It was the right size, had a tail like a mouse, and had a button eyeball like the Star/Lisa/Mac mouse devices. It plugged into the joystick plug on the back of the computer and had a ball underneath that rolled when it moved.

"I want to see a word processing window overlapping a spreadsheet window and a graphics window," I said to the sales person.

He pulled out three ROM packs and stacked them up on the counter. I recognized them since I already had two of them at home.

"How do you make the mouse control these?" I asked.

He answered, "Oh, the mouse works like a joystick. Anywhere you can use a joystick, you can use the mouse."

Since I had a joystick, I didn't see the need for a "rodent" that did the same thing. I left without buying one, but I knew what I needed: software! I would first write a program to use the mouse, then buy one. A database seemed a natural application for the mouse. Not a large system with detailed formatting requirements and inquiry procedures, but a small one that would allow me to store names, addresses, references to magazine articles and other miscellaneous items.

The system would be like an index card file in that it would: 1) Have unformatted records, 2) Be indexed alphabetically, 3) Have no restrictions on updating and 4) Be accessed without typed commands. The hardware constraints were that it had to run in a 16K Color Computer with one disk drive; the software constraints were that it should be written in BASIC with no special PEEKs or POKEs. The result was *Julie*.

The *Julie* Program

The *Julie* program requires most of the user random-access memory (RAM) in a 16K system with one disk drive. Part of this RAM is needed to use the direct (ramdom access) disk files, part is used for string manipulation, and most of the rest is filled by the program. Having more than 16K will not improve performance, so you will not miss anything if you only have 16K.

To start *Julie*, do the following:

1) Turn everything on.
2) Insert diskette in Drive 0.
3) Type `RUN "JULIE"` and press ENTER.

The first thing that happens is the screen is blanked (cleared to black color) and then filled with green in small

---

Stephen P. Clark is a computer specialist at Florida State University. He has worked in data processing for 15 years, and has a master's degree in computer and management information systems from American University in Washington, D.C.

chunks. This is as close to opening graphics as possible on a 16K system. Once the screen is all green, you will get a display that looks like the following:

```
 FILES: (102K AVAILABLE)
   EXIT
 -> OPEN NEW FILE
```

This is the Files screen. If there are any *Julie* files on the disk you are using, the names will be included in the list. Up to 12 files can be included on a single diskette, a limit set by the number of lines on the screen display.

Using the mouse you can move the arrow up or down to make a selection. Left and right movement of the mouse will not have any effect on the arrow. Move the arrow until it points to the option or file you want, then press the button. Since buttons tend to become worn and need to be pressed hard at times, I added feedback in the program; whenever a button press is detected, the word "button" appears on the right side near the top of the screen. This is true throughout the program, so look for it if you are having trouble with your button.

The choices lead to the following actions.

Exit: This ends the program and returns to the familiar OK prompt. You are back in BASIC.

Open New File: This is the way to create a new *Julie* file. If you point to this option and press the button, you will be asked for a filename. The name can be up to eight characters long, using the normal rules for naming files. Do not enter an extension since the program will add `/JDF`. This allows it to search the directory and find the files it can use.

Filename: Any *Julie* (`/JDF`) files previously created are listed on the Files screen. If you point to the name of the file and press the button, that file will be opened for you. You can then add more data, modify existing data or just browse through the file. You can do all three while the file is open, and without changing modes or running another program.

The Open File Screen

When you open a file, you are presented with a screen that looks like this:

```
ADD EDIT EXIT INDEX DELETE FILES
ABCDEFGHIJKLMNOPQRSTUVWXYZ+-WORD
________________________________



________________________________
0 RECORDS IN filename
```

This is the Open File screen. It is the basic means of communicating with a *Julie* file. The top "window" is where the arrow, under control of the mouse, operates. Within this window, the arrow can be moved freely up, down, right or left. It can be placed over a letter and will block the letter from view. As soon as you move the mouse (arrow), the letter will reappear.

Use the same technique of pointing to something and pressing the button. To make a selection, you must place the arrow below what you want to select. On the top line, "add" through "files," you can point to any letter of the word. Be careful when selecting "delete."

Line three of the top window contains the letters of the alphabet, a plus sign and minus sign and "word." This line is used to search the file for entries. Pointing to 'E' and pressing the button will find any entries beginning with 'E', and so on. The plus sign will move to the next record, while the minus sign will move back one record; you can use these to step through the file sequentially. "Word" is used to search for entries containing a particular word or group of characters. Select it and you will be asked to enter a word to search for.

> "You could have an entire diskette for books, say, if your book collection is extensive. It could contain files like Fiction, Nonfict, Science, Computer or whatever categories you can think of."

In all the file search options, you can find the next similar record by pressing the button again, without moving the arrow. If you move the arrow, the program starts over. For example, point to a letter, then press the button. If a record is found, it will be displayed; press the button again and the next record will be displayed. Continue this until all have been displayed.

The top line of options works as follows.

Add: This is the way new records are added to a file. The top selection window will be replaced with an instruction window for editing a record. The record will be entered in the middle window. The editor is a full-window editor and you can move the cursor anywhere in the window and type something. A low "beep" will sound as each key is pressed.

The arrow keys move the cursor in four directions, but it will not leave the middle window. The ENTER key moves you to the next line. When you type something, it will be entered at the cursor position, and the cursor will advance one position. If you want to change a letter, put the cursor over it and type the new letter. SHIFT-left-arrow will delete whatever is under the cursor; SHIFT-right-arrow will insert a space; the CLEAR key is used to end the process.

The first letter in the record you enter is used to index the record, so plan ahead. If you do not start it with a letter, an 'X' is inserted.

Edit: This works exactly like Add, except that you start with an existing record from the file instead of a blank record. To edit, you must first display the record, then move the arrow to Edit and press the button. Press the CLEAR key to restore the record in the file.

Exit: This is exactly like the Exit on the Files screen; it returns you to BASIC.

Index: This shows you the index of all the first letters of all the records in the file. Periods are used to denote empty records. You can have up to 249 records in one file, which would fill up most of a diskette.

Delete: Used to delete records from a file. First, you must display the record by searching for it through the normal means, then, while it is on the screen, move the arrow to the Delete option and press the button.

Files: This returns you to the Files screen so you can open another file, start a new file or simply exit. With this option it is easy to move back and forth among files without stopping and starting several programs, as is the case with some database systems.

Records, Files and Databases

A record is the smallest unit of data in *Julie*. It is composed of 249 characters and can be in any format. You can put any text or numbers you want in a *Julie* record. The main disadvantage to the unformatted approach is that individual items are not recognized as being distinct. If you are searching for the word "Smith," you will also get "Blacksmith," "Smithsonian," etc.

A file is a collection of records in *Julie*. They do not have to be related, but should be to help you locate things in the future. I have a file called "Address" to keep my address book, and one called "Articles" to keep references to published articles. One called "Books" could be used to inventory books, and one called "Records" could keep your record collection in order. The only limit is your imagination.

A diskette could reasonably be called a database. I have limited the system to operating on a single diskette, which must contain the program and the data files. You could have an entire diskette for books, say, if your book collection is extensive. It could contain files like Fiction, Nonfict, Science, Computer or whatever categories you can think of. The fact that books are in separate files does not present a problem, since you can go back and forth between files easily.

I have found this program to be useful for storing many types of data. It is a pleasure to move the cursor around the screen with a joystick (I still haven't purchased a mouse), and shows the wisdom of the "point and press" user environment.

(Any questions about this program may be directed to Stephen Clark, 1503 Childs Street, Tallahasse, FL 32303; phone 904-644-4836.) ☐

220	12
540	129
680	1
2110	225
2800	40
4050	86
6040	41
9020	25
9340	146
END	184

The listing: JULIE

```
10 GO TO 10000
20 CLEAR 2000:DIM FX$(12):'CONTI
NUE HERE
100 'JULIE - AN EXPERIMENTAL LIS
A WORKALIKE PROGRAM
105 ' (C) 1983 BY S. P. CLARK
110 GOSUB 9300:'INITIALIZE
120 IF PSN<>LPSN THEN GOSUB 8000
:'PRINT SCREEN
130 LPSN=PSN:CUR$=CHR$(94):'SAVE
 CURSOR POSITION
140 XC=INT(JOYSTK(0)/2)+1:'LEFT-
RIGHT READING
150 YC=INT(JOYSTK(1)/4)+1:'UP-DO
WN READING
155 IF YC>3 THEN YC=3
160 PSN=YC*32+XC-1:'CALCULATE CU
RSOR POSITION
170 IF YC=2 THEN CUR$=CHR$(126)
180 PRINT@PSN,CUR$;:'WRITE CURSO
R
190 GOSUB 3000:'CHECK BUTTON
200 IF BUTTON=0 THEN 120:'REPEAT
 IF NOT PRESSED
210 LPSN=0:'RESET CURSOR POSITIO
N
220 IF YC=1 AND XC<5 THEN GOSUB
4000:GO TO 120:'ADD NEW
225 IF YC=1 AND XC<9 THEN GOSUB
1500:GO TO 120:'EDIT
230 IF YC=1 AND XC<14 THEN CLOSE
:END:'END PROGRAM
233 IF YC=1 AND XC<20 THEN GOSUB
 7000:GO TO 120:'SHOW INDEX
235 IF YC=1 AND XC<27 THEN GOSUB
 5000:GO TO 120:'DELETE CURRENT
RECORD
237 IF YC=1 AND XC>27 THEN CLOSE
:GO TO 100:'START OVER
240 IF YC=3 AND XC<27 THEN GOSUB
 6000:GO TO 120:'SEARCH FOR MATC
H
243 IF YC=3 AND XC<29 THEN GOSUB
 2800:GO TO 120:'MOVE 1 RECORD
245 IF YC=3 AND XC>28 THEN GOSUB
 2500:GO TO 120:'WORD SEARCH
250 GO TO 120:'REPEAT
500 '-----------------------
RECORD INPUT/EDIT
510 C=1:CUR$=CHR$(159):SR$=CHR$(
93):SL$=CHR$(21):PRINT@409,STRIN
G$(7,CHR$(128));
512 IF LEN(WL$)<249 THEN WL$=WL$
+STRING$(249-LEN(WL$)," ")
515 U$=CHR$(94):D$=CHR$(10):L$=C
HR$(8):R$=CHR$(9):CR$=CHR$(13):C
S$=CHR$(12):'POSITION CHARACTERS
520 PRINT@0,"COMMANDS: arrows CO
NTROL CURSOR, shift R/L = INSERT
/DELETE CHAR, enter = NEXT LINE,
 clear = END."
540 IF C<1 OR C>249 THEN C=1
560 PRINT@160,WL$;:PRINT@159+C,C
UR$;
590 A$=INKEY$:IF A$=""THEN 590 E
LSE SOUND 150,1
600 IF A$=U$ THEN C=C-32:GO TO 5
40
610 IF A$=D$ THEN C=C+32:GO TO 5
40
620 IF A$=L$ THEN C=C-1:GO TO 54
0
630 IF A$=R$ THEN C=C+1:GO TO 54
0
640 IF A$=CR$ THEN C=32*INT((C+3
1)/32)+1:GO TO 540:'CARRIAGE RET
URN
650 IF A$=SL$ THEN I$=RIGHT$(WL$
,249-C)+" ":MID$(WL$,C)=I$:GO TO
 540
660 IF A$=CS$ THEN 690:'CLEAR =
END
665 IF A$=SR$ THEN I$=MID$(WL$,C
,249):MID$(WL$,C)=" "+I$:GO TO 5
```

```
40
670 MID$(WL$,C,1)=A$:C=C+1:GO TO
 540:'ADD CHARACTER
680 '----------CHECK FIRST CHARA
CTER AND RETURN
690 L$=LEFT$(WL$,1):IF L$<"A" OR
 L$>"Z" THEN MID$(WL$,1,1)="X"
695 RETURN
1000 '--------------------------
FIND NEXT INDEX RECORD MATCH
1010 IF REC<0 THEN REC=0
1020 I=REC+1
1030 REC=INSTR(I,INDX$,MATCH$)
1040 IF REC>LOF(1)-1 THEN REC=0
1060 RETURN
1500 '--------------------------
EDIT RECORD
1505 IF REC<1 OR REC>LOF(1)-1 TH
EN RETURN
1510 GOSUB 500:'EDIT
1520 GOSUB 2000:'STORE ON DISK
1530 WL$=STRING$(249," "):'BLANK
 IT OUT
1540 RETURN
2000 '--------------------------
PUT RECORD IN SLOT "REC"
2010 IF REC<1 OR REC>LOF(1) THEN
 2100
2015 GET#1,1
2020 PRINT #1,WL$
2030 PUT #1,REC+1
2050 MID$(INDX$,REC,1)=WL$
2080 PRINT #1,INDX$
2090 PUT #1,1
2100 REC=0
2110 RETURN
2500 '--------------------------
WORD SEARCH ROUTINE
2510 IF WORD$<>"" THEN 2520
2512 PRINT@160,STRING$(255," "):
PRINT@160,"ENTER THE WORD TO SEA
RCH FOR     "
2514 LINE INPUT "?";WORD$:REC=0:
NWS=0:SMSG$=" "+LEFT$(WORD$,8)
2516 IF LEN(SMSG$)<10 THEN SMSG$
=SMSG$+STRING$((10-LEN(SMSG$)),"
 ")
2520 REC=REC+1:PRINT@160,STRING$
(255," ")
2530 IF REC>LOF(1)-1 THEN WORD$=
"":GO TO 2600
2540 IF MID$(INDX$,REC,1)="." TH
EN 2520
2550 GET #1,REC+1
2560 LINE INPUT #1,WL$
2570 IF INSTR(1,WL$,WORD$)=0 THE
N WL$="":GO TO 2520
2580 NWS=1
2590 RETURN
2600 IF NWS=1 THEN SMSG$= "  no
more" ELSE SMSG$="not found"
2605 WORD$=""
2610 RETURN
2800 '--------------------------
NEXT RECORD + OR -
2810 IF XC=27 THEN REC=REC+1
2820 IF XC=28 THEN REC=REC-1
2830 IF REC<1 OR REC>LOF(1)-1 TH
EN SMSG$="  no more":RETURN
2840 IF MID$(INDX$,REC,1)="."THE
N 2810
2845 PRINT@160,STRING$(255," ")
2850 GET#1,REC+1:LINE INPUT #1,W
L$
2860 RETURN
3000 '--------------------------
CHECK BUTTON PUSH
3010 BUTTON=0:'SET INITIALLY=NO
3020 TEST=PEEK(65280):'READ BUTT
ON
3030 IF TEST=255 OR TEST=127 THE
N RETURN:'NO PRESS
3040 BUTTON=1:'SET FOR YES
3045 PRINT@54,"   button ";
3050 GO TO 3020:'REPEAT UNTIL UP
4000 '--------------------------
ADD A RECORD FROM INPUT
4005 REC=0:'INITIALIZE SEARCH
4010 MATCH$="."
4020 GOSUB 1000:'FIND EMPTY SLOT
4030 IF REC<1 THEN REC=LOF(1)
4040 IF REC>248 THEN WL$="*** TH
IS FILE IS FULL ***":RETURN
4045 IF FREE(0)<5 THEN WL$="***
THIS DISK IS FULL ***":RETURN
4050 WL$=STRING$(249," ")
4060 GOSUB 500:'INPUT RECORD
4080 GOSUB 2000:'PUT RECORD TO D
ISK
4085 WL$=STRING$(255," ")
4090 RETURN
5000 '--------------------------
DELETE A RECORD
5010 IF REC<1 OR REC>LOF(1)-1 TH
EN 5050
5020 WL$="..."
5030 GOSUB 2000:REC=0
5040 SMSG$="   delete"
5045 SOUND 100,5
5047 WL$=STRING$(255," ")
5050 RETURN
6000 '--------------------------
SEARCH FOR MATCHING RECORD
6005 MATCH$=CHR$(XC+64)
6007 SMSG$="not found":IF REC >0
 AND LMATCH$ = MATCH$ THEN SMSG$
```

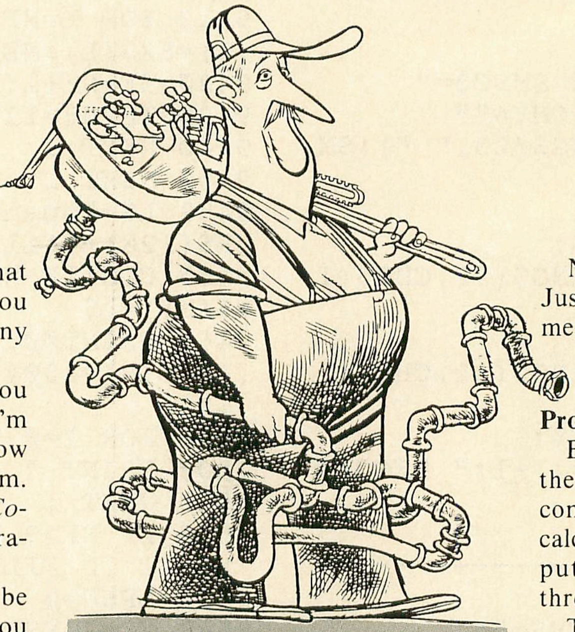
```
="no more  "
6010 IF LMATCH$="" THEN REC=0
6015 LMATCH$=MATCH$
6020 GOSUB 1000:'FIND MATCHING R
ECORD
6030 IF REC=0 THEN WL$=STRING$(2
55," "):PRINT@54,SMSG$;
6040 IF REC>0 THEN GET#1,REC+1:L
INE INPUT #1,WL$:SMSG$="
 "
6045 PRINT@160,STRING$(255," ")
6050 RETURN
7000 '--------------------------
SHOW THE INDEX
7010 WL$=INDX$
7020 REC=0
7030 SMSG$="     index"
7040 RETURN
8000 '--------------------------
PRINT A SCREEN
8010 PRINT@0,L1$;
8015 IF LPSN>0 THEN SMSG$="
    ":WORD$="":LMATCH$=""
8020 PRINT@32,STRING$(23," ");SM
SG$;
8030 PRINT@64,L3$;
8040 PRINT@96,BLNK$;
8050 PRINT@128,STRING$(32,CHR$(1
28));
8060 PRINT@160,WL$
8070 PRINT@416,STRING$(32,CHR$(1
28));
8080 PRINT@448,BLNK$;
8085 PRINT@480,LOF(1)-1;" RECORD
S IN ";NAME$;
8090 RETURN
9000 '--------------------------
SET UP WINDOWS
9010 WORD$="":LMATCH$=""
9020 CLS3:PRINT@167,"OPENING ";N
AME$;
9030 L1$="ADD EDIT EXIT INDEX DE
LETE FILES"
9040 L3$="ABCDEFGHIJKLMNOPQRSTUV
WXYZ+-WORD"
9050 BLNK$=STRING$(32," ")
9060 LPSN=0
9070 PSN=1
9080 CUR$=CHR$(94)
9085 NL=LEN(NAME$):IF NL>8 THEN
NL=8
9090 L$=LEFT$(NAME$,NL)+"/JDF"
9100 OPEN "D",#1,L$,256
9105 IF LOF(1)<1 THEN INDX$=STRI
NG$(249,"."):REC=0:WL$=INDX$:PRI
NT #1,INDX$:PUT #1,1
9110 GET #1,1
9120 LINE INPUT #1,INDX$
9130 WL$="":CLS
9140 RETURN
9300 '--------------------------
SELECT FILE
9310 NF=0:FX$(1)="ZZ       ":CLS0
:FX$(0)="exit":PRINT "       ";
9320 FOR I=3 TO 11:DSKI$ 0,17,I,
L$,R$:L$=L$+LEFT$(R$,127)
9330 FOR J=0 TO 7:CP=J*32
9335 PRINT "      ";
9340 IF MID$(L$,CP+9,3)<>"JDF" T
HEN 9440
9350 T=ASC(MID$(L$,CP+1,1)):IF T
=0 OR T=255 THEN 9440
9360 R$=MID$(L$,CP+1,8)
9370 'INSERT IN SORT ORDER
9380 FOR K=1 TO NF
9390 IF R$<FX$(K)THEN 9410
9400 NEXT K
9410 FOR L=NF TO K STEP -1:FX$(L
+1)=FX$(L):NEXT L
9420 NF=NF+1:FX$(K)=R$
9430 IF NF>11 THEN 9452
9440 NEXT J
9450 NEXT I
9452 L$="open"+CHR$(128)+"new"+C
HR$(128)+"file"
9455 CLS:IF NF<12 THEN NF=NF+1:F
X$(NF)=L$
9460 PRINT@0,"  FILES:     (";INT
(FREE(0)*2304/1000);"K AVAILABLE
 )"
9490 FOR I=0 TO NF
9500 PRINT "     ";FX$(I)
9510 NEXT I
9515 IF NF>9 THEN PRINT@448,"***
 LIMIT 12 FILES PER DISK ***";
9520 LPSN=0
9522 XC=JOYSTK(0):NI=INT(JOYSTK(
1)/4):PSN=(NI+1)*32+4
9523 IF PSN>420 THEN PSN=420
9524 PRINT@LPSN,"  ";:PRINT@PSN,
"->";:LPSN=PSN
9526 GOSUB 3000:'CHECK BUTTON
9528 IF BUTTON=0 THEN 9522
9530 IF NI<0 OR NI>NF THEN PRINT
@54,"          ";:GO TO 9522
9535 NAME$=FX$(NI)
9540 IF NAME$=L$ THEN PRINT@492,
STRING$(8,CHR$(128));"/JDF";:PRI
NT@480,"FILE NAME:";:INPUT NAME$
9545 IF NAME$="exit" THEN CLOSE:
PRINT@448,"";:END:'EXIT
9547 IF LEN(NAME$)>8 THEN NAME$=
LEFT$(NAME$,8)
9550 GOSUB 9000
9560 RETURN
10000 PCLEAR1:FILES3:GO TO 20
```

HOME HELP

32K
ECB

Hire the CoCo Handiman

By Leonard Hyre



"So, what do you do now that all the aliens are dead and you don't want to process any words?"

If you have a computer, then you know the person whose words I'm quoting. He or she just doesn't see how a computer could be of any use to them. Well, you might just load up *CoCo-Handiman* and give him a demonstration.

Actually, *CoCo-Handiman* can be your helper around the house. If you want to do some paneling, painting, wallpapering, or if you wish to carpet a room, pour a concrete patio, or even tile a bath or ceiling, then this program is for you. Whatever the job, just choose from the menu and answer prompts on the screen. A printed "job estimate" is optional after each calculation. This is very handy for comparing the final cost of a project using various price ranges for construction, or for determining how much material will be needed for a particular job.

No instructions for use are necessary. Just make a couple of dry runs for each menu selection and you'll be an expert.

Program Structure

Eight separate subroutines make up the bulk of *CoCo-Handiman*. These consist of a title screen, six different calculation routines and a printer output. Each can easily be followed through without difficulty.

Title Screen: Lines 1145-1165 are used to display the title and author's name (ego stroke). Alternately poking 359 with 57 and 126 causes the text on the screen to flash between black on green and red on orange. After a few seconds the program jumps to the menu screen (lines 30-90). Of interest to the novice might be the use of the `INSTR` command in Line 85. This is a powerful CoCo command, not available on many machines costing much more.

Paneling and Painting: Lines 95-160 are shared by Paneling and Painting equally. The necessary measurements are obtained here. Paneling continues from Line 165 through 210 and painting is completed from 215 through 305.

Wallpaper: This subroutine occupies lines 310-405, first obtaining needed measurements and wallpaper data from the user before offering an estimate of rolls needed and total cost.

Leonard Hyre is the author of Federal Hill Software's Handicapper *series and a number of articles for* RAINBOW. *He also published several articles in* RAINBOW'*s sister publication,* SOFT SECTOR, *for Sanyo computers, and is the author of* Sanyopoly, *a new Sanyo game from Michigan Software.*

Carpeting and Tiles: These two menu choices ('4' and '6') share the same basic calculation, with special requirements for each being differentiated by the original menu selection string, AN$(4 or 6)! (lines 415-570). Also, a room outline is on-screen to show the user some of the terminology to be encountered. The room is drawn by printing `CHR$(128)` as needed. Lines 580-620 complete the carpeting routine. Tiles are finished up with lines 825 through 915.

Concrete: Lines 655-820 handle the concrete chores. This one required a bit more detailed drawing as an example so the `PMODE 1` screen is called up for a drawing of a concrete pour (optional to user).

Print Routine: Lines 920-1125 provide printer owners with optional job estimates. I must now make a confession. My friend Mike Himowitz is the creator of the print routine. Wow, I'm glad to get that off my mind! I think you will agree he has done a super job here.

Final Comment

I believe you will find *CoCo-Handiman* a useful addition to your CoCo software library. It's not the type of program you will use every day, rather one that will be used as any other tool — when the need arises.

In case you are intimidated by the length of the program, I will be happy to send you a copy on tape for $4.50 to cover the cost. Just send the $4.50 along with your request to: Leonard Hyre, P.O. Box 403, Cambridge, MD 21613. ☐

Sample Printouts

```
**********************************************************************
**********************************************************************

                         COCO-HANDIMAN

                         JOB  ESTIMATE

**********************************************************************
**********************************************************************


            CARPETING CALCULATION: LIVING ROOM

            MAIN AREA  50  BY  30  FEET
            COST PER SQ/YD$  3.00

            YOU WILL NEED 166  SQUARE YARDS
            TOTAL COST: $  498.00

**********************************************************************
**********************************************************************

                         COCO-HANDIMAN

                         JOB  ESTIMATE

**********************************************************************
**********************************************************************


            CONCRETE ESTIMATE

            *****MAIN AREA*****

            WIDTH 100  FEET 0  INCHES
            LENGTH 120  FEET 0  INCHES
            DEPTH 10  FEET 0  INCHES

            TOTAL CUBIC YARDS REQUIRED: %4444.44

**********************************************************************
**********************************************************************

                         COCO-HANDIMAN

                         JOB  ESTIMATE

**********************************************************************
**********************************************************************


            FLOOR TILE CALCULATIONS: MASTER BEDROOM

            MAIN AREA  30 BY  40 INCHES
            USING 9  INCH TILES,
            YOU WILL NEED 21  TILES
```

75	202	475	71	890	250
135	86	550	233	965	175
220	94	610	73	1000	96
285	95	695	132	1055	148
350	216	760	96	1085	125
430	23	815	24	END	190

The listing: HANDIMAN

```
5 REMCOCO HANDIMAN
10 REM32K COCO
15 REM(C)1986 L.HYRE CAMBRIDGE M
D
20 CLS
25 GOSUB 1145
30 CLS:GOSUB645:PRINTSTRING$(66,
246)" C O C O ** H A N D I M A N
 ";STRING$(66,246);:PRINTSTRING$
(11,255);" THE MENU ";STRING$(11
,255);
35 ZZ=0:ZY=0:ZX=0:WN=0:WP=0:DR=0
:NF=0:GN=0:CG=0:CP=0:NW=0:SB=0:T
W=0:HW=0:NZ=0:ND=0:CR=0:WM=0:LM=
0:AW=0:AL=0:BW=0:BL=0:CW=0:CL=0:
CX=0:WX=0:YD=0:WF=0:WI=0:LF=0:LI
=0:HF=0:HI=0
40 AW=0:AK=0:AL=0:AI=0:AH=0:AJ=0
:TW=0:TX=0:TL=0:TY=0:TH=0:TZ=0:W
TL=0:LTL=0:OQ=0
45 PRINTTAB(11);"1.PANELING"
50 PRINTTAB(11);"2.PAINTING"
55 PRINTTAB(11);"3.WALLPAPER"
60 PRINTTAB(11);"4.CARPETING"
65 PRINTTAB(11);"5.CONCRETE":PRI
NTTAB(11);"6.TILES"
70 SOUND125,1:PRINT:PRINTTAB(8);
"YOUR CHOICE?": SOUND125,1:PRINT
STRING$(32,142);
75 AN$=INKEY$
80 IF AN$=""THEN 75
```

```
85 ON INSTR("123456",AN$)GOTO 95
,95,310,415,655,415
90 GOTO 75
95 CLS:GOSUB625:PRINT@0,STRING$(
32,204):PRINT:PRINT"MEASURESMENT
S---":PRINTSTRING$(16,131):PRINT
"HT OF WALL(FT/IN.)":INPUT"FT. "
;HA$:GOSUB625:INPUT"IN";HB$:GOSU
B625
100 PRINT"WIDTH A (FT/IN)":LINEI
NPUT"FT?";WF$:GOSUB625:LINEINPUT
"IN?";WI$:GOSUB625:INPUT"NO.OF W
ALLS THIS SIZE";AZ:GOSUB635:PRIN
T"WIDTH B (FT/IN)":LINEINPUT"FT?
";WG$:GOSUB625:LINEINPUT"IN?";WJ
$:GOSUB625:INPUT"NO.OF WALLS THI
S SIZE";AX:GOSUB635
105 CLS:PRINTSTRING$(32,204):PRI
NT:PRINT"MEASUREMENTS---":PRINTS
TRING$(16,131)
110 INPUT"NO.OF REGULAR WINDOWS"
;WN:GOSUB 625
115 INPUT"NO.OF PICTURE WINDOWS"
;WP:GOSUB625:OQ=WP
120 INPUT"NO.OF DOORS";DR:GOSUB
625
125 ZZ=VAL(HA$)*12+VAL(HB$)
130 ZY=VAL(WF$)*12+VAL(WI$)
135 ZX=VAL(WG$)*12+VAL(WJ$)
140 WA=WN*1152:WP=WN*2306:DA=DR*
1980:RE=WA+WP+DA
145 PCLS:GOSUB645
150 GA=(ZZ*ZY)*AZ+(ZZ*ZX)*AX:GA=
GA-RE
155 NF=INT(GA/144):NI=GA-(NF*144
)
160 IFAN$="1"THEN 165 ELSEIF A
N$="2"THEN 215 ELSEIF AN$="3"THE
N310
165 PRINTSTRING$(32,".");:PRINT"
 WHAT ROOM ARE WE WORKING WITH?
170 LINEINPUT RM$:IF RIGHT$(RM$,
4)<>"ROOM" THEN RM$=RM$+" ROOM":
GOSUB625
175 NP=NF/32
180 CLS:GOSUB645: PRINT@0,STRING
$(64,200);:PRINT"        PANEL CA
LCULATIONS":PRINTSTRING$(32,200)
185 PRINT" FOR YOU TO DO THE":PR
INT" ";RM$:PRINT" YOU WILL NEED
APPROXIMATLEY":PRINTUSING"###.#"
;NP:PRINT" SHEETS OF PANEL"
190 PRINTSTRING$(32,200)
195 PRINT"PRINT THIS (Y/N)";
200 LQ$=INKEY$:IFLQ$=""THEN200
205 IF LQ$="Y"THEN GOSUB940
210 GOTO 30
215 CLS:PRINTSTRING$(33,208);:PR
INT"      PAINTING CALCULATIONS
    ";STRING$(33,208);
220 PRINT"WHAT ROOM ARE WE WORKI
NG WITH?";STRING$(33,128);:LINE
INPUT RM$:IF RIGHT$(RM$,4)<>" RO
OM"THEN RM$=RM$+" ROOM":GOSUB625
225 PRINT"COST OF PAINT/GALLON?$
";:LINEINPUT CG$:GOSUB625
230 PRINT"HOW MANY COATS WILL  Y
OU APPLY? ";:LINEINPUT NC$:GOSUB
625
235 PRINT"HOW MANY SQ.FT/GAL":PR
INT"DOES  MFG.RECOMEND?":LINEINP
UT FG$:GOSUB625
240 PRINT"WILL YOU BE DOING THE
CEILING?(Y/N)":GOSUB625
245 A$=INKEY$:IFA$=""THEN 245
250 IFA$=<>"Y"THEN 260
255 NF=((ZY*ZX)/144)+NF
260 CLS:GOSUB645
265 CLS:PRINTSTRING$(33,201);:PR
INT"      PAINTING CALCULATIONS
 ";STRING$(33,201);
270 PRINT:PRINT"TO PAINT THE ";:
PRINTRM$:PRINT"YOU WILL NEED ":G
N=NF/VAL(FG$)*VAL(NC$):PRINTUSIN
G"###.#";GN;:PRINT" GALLONS."
275 PRINT:PRINT"THE APPROXIMATE
COST WILL  BE"
280 CG=VAL(CG$):CP=GN*CG
285 PRINTUSING"$###.##";CP
290 PRINT "PRINT THIS <Y/N>?"
295 OG$=INKEY$:IFOG$=""THEN295
300 IFOG$="Y"THEN GOSUB965
305 GOTO 30
310 CLS:PRINTSTRING$(33,202);"
  WALLPAPER CALCULATION     ";ST
RING$(33,202)
315 INPUT"WHAT ROOM ARE WE WORKI
NG WITH ";RM$:IF RIGHT$(RM$,4)<>
"ROOM"THEN RM$=RM$+" ROOM":GOSUB
625
320 PRINT"MEASURE & RAISE  RESUL
T TO THE  NEXT WHOLE FOOT!
325 PRINT"NOTE:  WE WILL BE USIN
G STANDARD36 SQ.FT. ROLL FOR CAL
CULATIONS WITH 6 SQ.FT FOR PATTE
RN MATCH.
330 PRINT"ON OCCASION YOU MAY FI
ND DOUBLE LENGTH ROLLS OF 72 SQ.
FT."
335 INPUT"WILL YOU BE USING THE'
SINGLE' SIZE <Y/N>";SS$:PCLS
340 CLS:PRINTSTRING$(32,"*")"***
**WALLPAPER MEASUREMENTS*****"ST
RING$(32,"*");:INPUT"WIDTH WALL
A";WA$:INPUT"NO.WALLS THIS SIZE"
;NW
345 INPUT"WIDTH WALL B";WB$:INPU
T"NO.WALLS THIS SIZE";SB
```

```
350 TW=VAL(WA$)*NW+VAL(WB$)*SB
355 INPUT"HEIGHT OF WALLS";HW:IN
PUT"NO.OF WINDOWS";NZ:INPUT"NO.O
F DOORS";ND
360 RO=(TW*HW)/30-(INT(NZ)/2+ND)
+1:IF SS$="N"THEN RO=RO/2:RO=INT
(RO)
365 INPUT"COST PER ROLL";CR
370 CLS:PRINTSTRING$(34,159)"
   WALLPAPERING         ";STRIN
G$(34,159);"FOR WALLPAPERING THE
":PRINTRM$
375 PRINT"YOU NEED ";INT(RO);" R
OLLS"
380 PRINT:PRINT"YOUR COST OF PAP
ER IS ";
385 PRINTUSING"$###.##";CR*RO:PR
INT
390 PRINT"PRINT THIS? <Y/N>"
395 OG$=INKEY$:IFOG$=""THEN395
400 IF OG$="Y"THEN GOSUB 990
405 GOTO 30
415 CLS:GOSUB645:PRINT STRING$(3
2,200);:IF AN$="4"THENPRINT"
 ** CARPETING A ROOM **      ";EL
SEIFAN$="6"THENPRINT"          ***T
ILING A ROOM***      ";
420 PRINTSTRING$(32,131);
425 PRINT"TERMS TO UNDERSTAND:":
PRINTTAB(5)"1-MAIN ROOM AREA":PR
INTTAB(5)"2-CUT OUTS":PRINTTAB(5
)"3-ADD ONS"
430 PRINT@228,STRING$(24,128):FO
RDW=260TO420STEP32:PRINT@DW,CHR$
(128):NEXTDW:FORDW=283TO379STEP3
2:PRINT@DW,CHR$(128):NEXTDW
435 PRINT@380,STRING$(2,128):PRI
NT@443,STRING$(3,128):FORDW=382T
O446STEP32:PRINT@DW,CHR$(128):NE
XTDW
440 PRINT@420,STRING$(27,128):PR
INT@263,STRING$(3,128);
445 PRINT@266,"<-3 ";:PRINT@333,
"<-1->";:PRINT@406,"2->";
450 PRINT@490,"press any key";
455 CT$=INKEY$:IFCT$=""THEN 455
460 CLS:PRINTSTRING$(33,179);"WH
ICH ROOM ARE WE WORKING WITH";ST
RING$(33,179);:INPUTRM$:IF RIGHT
$(RM$,4)<>"ROOM"THEN RM$=RM$+" R
OOM"
465 IF AN$="4"THENPRINTSTRING$(3
8,255)"MEASURING FOR CARPET";STR
ING$(38,255);:ELSEIFAN$="6"THENP
RINTSTRING$(38,255)"MEASURING FO
R TILES ";STRING$(38,255);
470 IF AN$="4"THENPRINT"USE NEAR
EST FOOT FOR MEASUREMENT";:ELSE
IF AN$="6"THEN PRINT"PLEASE ENTE
R TOTAL NUMBER INCHES";
475 PRINTSTRING$(32,195);:INPUT
"WIDTH MAIN AREA";WM:GOSUB625:IN
PUT"LENGTH MAIN AREA";LM:GOSUB 6
25
480 CLS:PRINTSTRING$(32,195):PRI
NT"ADD-ON  Areas (Y/N)":GOSUB625
485 A1$=INKEY$:IFA1$=""THEN 485
490 IF A1$="Y"THEN INPUT"WIDTH
";AW:INPUT"LENGTH ";AL
495 IF A1$<>"Y"THEN  520
500 PRINT"OK. ANY MORE? (Y/N)":G
OSUB 635
505 A2$=INKEY$:IFA2$=""THEN 505
510 IF A2$="Y" THEN PRINT"I ONLY
 HAVE PROVISIONFOR 1 MORE AREA."
:PRINT"SO ADD TOGETHER":PRINT"AL
L OTHER ADD ON'S":FORX=1TO4:PLAY
"V31T150O4ACEGO5ACEG":NEXTX
515 IF A2$="Y"THEN INPUT"WIDTH
";BW:GOSUB625:INPUT"LENGTH ";BL:
GOSUB625
520 IF AN$="4"THEN JQ$="FOOT"
525 IF AN$="6"THEN JQ$="INCH"
530 PRINTSTRING$(32,131);"NOW FO
R 'CUT-OUTS'":PRINT"REMEMBER TO
MEASURE TO NEAREST  ";JQ$
535 PRINT"ARE THERE ANY? ":GOSUB
 635
540 A3$=INKEY$:IFA3$=""THEN 540
545 IF A3$<>"Y"THEN 570
550 IF A3$="Y"THEN PRINT"WIDTH "
;:INPUT CW:GOSUB625:INPUT"LENGTH
 ";CL:GOSUB625
555 PRINT"ANY MORE 'CUT-OUTS'?":
FORX=1TO5:PLAY"V31O5T150AGAGAG":
NEXTX
560 A4$=INKEY$:IFA4$=""THEN 560
565 IF A4$="Y"THEN INPUT"WIDTH "
;CX:INPUT"LENGTH ";WX
570 IF AN$="6" THEN 825
575 PRINTSTRING$(32,131):PRINT"C
OST PER SQ. YARD":INPUTYC:GOSUB6
25
580 CLS:GOSUB645:PRINT@0,STRING$
(32,142):PRINT"CARPETING CALCULA
TION":PRINTSTRING$(32,142)
585 PRINT"YOU WILL NEED APPROX."
;
590 CC=(WM*LM)+(AW*AL)+(BW*BL)-(
CW*CL)-(CX*WX):YD=CC/9
595 PRINT INT(YD);"SQ.YDS":PRINT
"OF CARPET."
600 PRINTSTRING$(32,142):PRINT"Y
OUR COST WILL BE ABOUT...":CS=YC
*INT(YD):PRINTUSING"$#,###.##";C
S:PRINT"FOR THE ";RM$
605 PRINTSTRING$(32,131);"PRINT
THIS? <Y/N>":PRINTSTRING$(32,131
)
610 OG$=INKEY$:IFOG$=""THEN 610
615 IF OG$="Y"THEN GOSUB1015
620 GOTO30
625 PLAY"T100V3105AGA"
630 RETURN
635 PLAY"T100V3101GGGGG"
640 RETURN
645 PLAY"T100V3105ACGACG"
650 RETURN
655 CLS
660 PRINTSTRING$(38,148)"CONCRET
E VOL.MEASURE";STRING$(38,148)
665 PRINT"FOR CONCRETE MEASUREME
NT YOU CANFIRST OBTAIN THE HEIGH
T,WIDTH   AND DEPTH OF THE MAJOR
 PART OF  THE  PROJECT. THEN WE
CAN 'ADD- ON'THE OTHER AREAS AS
REQUIRED  OR    'TAKE-OFF'."
670 FORTI=1TO500:NEXT:SOUND125,1
:PRINT:PRINT"DO YOU WISH TO SEE
AN EXAMPLE  ";:INPUT" <Y/N>";AN$
:IF AN$="Y"THEN 675 ELSE 700
675 PMODE1,1:PCLS:FORTI=1TO590:N
EXT:SCREEN1,0
680 LINE(0,0)-(255,181),PSET,B:D
RAW"BM60,110;C3;R120G30L120E30D2
0G30U20BD20R120U20BD20E30U20BD20
L120BR120BG15U20R30G15L30BD20R30
U20BD20E15U20BD20L30
685 LINE(0,40)-(255,40),PSET
690 DRAW"BM12,142;C4;D20R8E2U18H
2L8BR4BU9D5BD30D5":DRAW"BM206,13
0;C4;D16F4E4U16BD16F4E4U16BH3E8B
G30BF3G8
695 DRAW"BM110,80;C4;D20R12BR3BU
10BR8L8BL20L8":FORTI=1TO1600:NEX
T
700 CLS:SOUND166,1:SOUND135,1
705 CLS:PRINTSTRING$(33,148);"
   CONCRETE MEASUREMENT     ";ST
RING$(33,148)
710 PRINT"ENTER ALL MEASUREMENTS
 AS 'FEET'AND THEN REMAINING AS
'INCHES'."
715 INPUT"WIDTH FT.";WF:INPUT"WI
DTH + IN.";WI
720 INPUT"LENGTH FT.";LF:INPUT"L
ENTH + IN.";LI
725 INPUT"HEIGHT(OR DEPTH) FT.";
HF:INPUT"HEIGHT + IN.";HI
730 MSQ=((WF*12)+WI)*((LF*12)+LI
)*((HF*12)+HI)
735 CLS:PRINTSTRING$(33,148);"
   CONCRETE MEASUREMENT     ";ST
RING$(33,148):INPUT"ANY ADD-ON A
REAS (Y/N)";AO$
740 IF AO$="Y"THEN 785 ELSE 745
745 INPUT"ANY TAKE-OFF AREA'S (Y
/N)";TU$
750 IF TU$="Y"THEN 805 ELSE 755
755 VCU=MSQ/46656
760 CLS:PRINTSTRING$(32,148);"TO
 COMPLETE PROJECT YOU WILL USEAP
PROXIMATLEY";:PRINTUSING"###.#";
VCU;:PRINT" CU.YDS OF":PRINT"CON
CRETE."
765 PRINT:PRINTSTRING$(32,131);"
PRINT THIS? <Y/N>":PRINTSTRING$(
32,131)
770 A$=INKEY$:IFA$=""THEN 770
775 IF A$="Y"THEN GOSUB 1060
780 GOTO 30
785 CLS:PRINTSTRING$(33,148);"
  CONCRETE MEASUREMENT       ";ST
RING$(33,148):GOSUB1135:INPUT"WI
DTH FT.";AW:INPUT"WIDTH IN.";AK:
INPUT"LENGTH FT.";AL:INPUT"LENGT
H IN.";AI:INPUT"HEIGHT FT.";AH:I
NPUT"HEIGHT IN.";AJ
790 ACU=((AW*12)+AK)*((AL*12)+AI
)*((AH*12)+AJ)
795 MSQ=MSQ+ACU
800 GOTO745
805 CLS:PRINTSTRING$(33,148);"
  CONCRETE MEASUREMENT       ";ST
RING$(33,148):GOSUB1140:INPUT"WI
DTH FT.";TW:INPUT"WIDTH IN.";TX:
INPUT"LENGTH FT.";TL:INPUT"LENGT
H IN.";TY:INPUT"HEIGHT FT.";TH:I
NPUT"HEIGHT IN.";TZ
810 TCU=((TW*12)+TX)*((TL*12)+TY
)*((TH*12)+TZ)
815 MSQ=MSQ-TCU
820 GOTO 755
825 CLS:PRINTSTRING$(67,198);"
 TILE  CALCULATIONS      ";STRING
$(67,198);
830 PRINTSTRING$(32,131)"ARE YOU
 USING 9 OR 12INCH TILES (9 or 1
2)"
835 INPUT TL$
840 IF TL$="9"OR TL$="12"THEN 84
5 ELSE 835
845 TL=VAL(TL$)
850 GOSUB885:W4=INT(CW/TL):L4=IN
T(CL/TL):W5=INT(CX/TL):L5=INT(WX
/TL)
855 TN=(W1*L1):IF A1$="Y" THEN T
N=TN+(W2*L2):IF A2$="Y"THEN TN=T
N+(W3*L3)
860 IF A3$="Y" THEN TN=TN-(W4*L4
):IF A4$="Y"THEN TN=TN-(W5*L5)
865 PRINTSTRING$(32,198):PRINT"Y
OU WILL NEED ":PRINT INT(TN)+1;"
 TILES
870 PRINTSTRING$(32,131);:PRINT"
PRINT THIS? (Y/N)"
```

```
875 A$=INKEY$:IFA$=""THEN 875
880 IF A$="Y" THEN 1085ELSEGOTO
30
885 IF WM/TL<>INT(WM/TL)THEN W1=
INT(WM/TL)+1 ELSE W1=WM/TL
890 IF LM/TL<>INT(LM/TL)THEN L1=
INT(LM/TL)+1 ELSE L1=WM/TL
895 IF AW/TL<>INT(AW/TL)THEN W2=
INT(AW/TL)+1 ELSE W2=AW/TL
900 IF AL/TL<>INT(AL/TL)THEN L2=
INT(AL/TL)+1ELSE L2=AL/TL
905 IF BW/TL<>INT(BW/TL)THEN W3=
INT(BW/TL)+1 ELSE W3=BW/TL
910 IF BL/TL<>INT(BL/TL)THEN L3=
INT(BL/TL)+1 ELSE L3=BL/TL
915 RETURN
920 PRINT#-2,STRING$(5,13):PRINT
#-2,TAB(5)STRING$(70,"*"):PRINT#
-2,TAB(5)STRING$(70,"*"):PRINT#-
2:PRINT#-2,TAB(33)"COCO-HANDIMAN
":PRINT#-2:PRINT#-2,TAB(33)"JOB
 ESTIMATE"
925 PRINT#-2:FOR ZV=1 TO 2:PRINT
#-2,TAB(5)STRING$(70,"*"):NEXT
930 PRINT#-2:PRINT#-2:RETURN
935 'REM PANEL PRINT
940 GOSUB 920
945 PRINT#-2,TAB(20)"PANELING CA
LCULATION: "+RM$:PRINT#-2
950 GOSUB 1115
955 PRINT#-2,TAB(20)"TOTAL SHEET
S NEEDED: ";:PRINT#-2,USING"###.
#";NP
960 RETURN
965 GOSUB 920:PRINT#-2,TAB(20)"P
AINTING CALCULATIONS: "RM$:PRINT
#-2
970 GOSUB 1115
975 PRINT#-2,TAB(20)"COST OF PAI
NT: "+"$"+CG$+" PER GALLON":PRIN
T#-2,TAB(20)"APPLYING "+NC$+" CO
ATS":IF A$="Y" THEN CO$="CEILING
 INCLUDED" ELSE CO$="CEILING NOT
 INCLUDED"
980 PRINT#-2,TAB(20)CO$:PRINT#-2
,TAB(20)"SPREAD RATE: "FG$" SQ.
FT PE GALLON":PRINT#-2:PRINT#-2,
TAB(20)"YOU WILL NEED ";:PRINT#-
2,USING"###.#";GN;:PRINT#-2," GA
LLONS":PRINT#-2,TAB(20)"APPROXIM
ATE COST: ";:PRINT#-2,USING "$##
##.##";CP
985 RETURN
990 GOSUB920:PRINT#-2,TAB(20)"WA
LLPAPER CALCULATION: "+RM$:PRINT
#-2:IF SS$="Y" THEN S1$="SINGLE
```

Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

Program submissions must be on tape or disk and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs. All programs should be supported by some editorial commentary explaining how the program works. Generally, we're much more interested in how your submission works and runs than how you developed it. Programs should be learning experiences.

We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submissions Editor, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you some more comprehensive guidelines.

Please do not submit programs or articles currently submitted to another publication.

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- *Add $3.00 For C.O.D.*

REM Industries, Inc.
9420 "B" Lurline Ave., Chatsworth, CA 91311
(818) 341-3719

```
SIZE ROLL" ELSE IF SS$="N" THEN
S1$="DOUBLE SIZE ROLLS"
995 PRINT#-2,TAB(20)S1$:PRINT#-2
,TAB(20)"WALL HEIGHT:"HW" FEET":
PRINT#-2,TAB(20)NW"WALLS "VAL(WA
$)" FEET LONG":PRINT#-2,TAB(20)S
B"WALLS "VAL(WB$)" FEET LONG"
1000 PRINT#-2,TAB(20)NZ "WINDOWS
":PRINT#-2,TAB(20)ND "DOORS":PRI
NT#-2,TAB(20)"COST PER ROLL: ";:
PRINT#-2,USING"$###.##";CR:PRINT
#-2
1005 PRINT#-2,TAB(20)"YOU WILL N
EED "INT(RO)" ROLLS":PRINT#-2,TA
B(20)"YOUR COST: ";:PRINT#-2,USI
NG"$###.##";CR*RO:PRINT#-2,STRIN
G$(5,13)
1010 RETURN
1015 GOSUB920:PRINT#-2,TAB(20)"C
ARPETING CALCULATION: "+RM$
1020 PRINT#-2:PRINT#-2,TAB(20)"M
AIN AREA "WM" BY "LM" FEET"
1025 IF A1$<>"Y" THEN 1035
1030 PRINT#-2,TAB(20)"ONE ADD-ON
 "AW" BY "AL" FEET":IF A2$="Y" T
HEN PRINT#-2,TAB(20)"OTHER ADD-O
NS "BW" BY "BL" FEET"
1035 IF A3$<>"Y" THEN 1045
1040 PRINT#-2,TAB(20)"ONE CUTOUT
 "CW" BY "CL" FEET":IF A4$="Y" T
HEN PRINT#-2,TAB(20)"OTHER CUTOU
TS "CX" BY "WX" FEET"
1045 PRINT#-2,TAB(20)"COST PER S
Q/YD";:PRINT#-2,USING"$###.##";Y
C
1050 PRINT#-2:PRINT#-2,TAB(20)"Y
OU WILL NEED"INT(YD)" SQUARE YAR
DS":PRINT#-2,TAB(20)"TOTAL COST:
 ";:PRINT#-2,USING"$#,###.##";CS
:PRINT#-2,STRING$(5,13)
1055 RETURN
1060 GOSUB920:PRINT#-2,TAB(20)"C
ONCRETE ESTIMATE":PRINT#-2:PRINT
#-2,TAB(20)"*****MAIN AREA*****"
:PRINT#-2:PRINT#-2,TAB(20)"WIDTH
"WF" FEET"WI" INCHES":PRINT#-2,T
AB(20)"LENGTH"LF" FEET"LI" INCHE
S":PRINT#-2,TAB(20)"DEPTH"HF" FE
ET"HI" INCHES":PRINT#-2
1065 IF AO$="Y" THENPRINT#-2,TAB
(20)"*****ADD-ONS*****":PRINT#-2
:PRINT#-2,TAB(20)"WIDTH"AW" FEET
"AK" INCHES":PRINT#-2,TAB(20)"LE
NGTH"AL" FEET"AI" INCHES":PRINT#
-2,TAB(20)"DEPTH"AH" FEET"AJ" IN
CHES":PRINT#-2
1070 IF TU$="Y" THEN PRINT#-2,TA
B(20)"*****CUTOUTS*****":PRINT#
-2:PRINT#-2,TAB(20)"WIDTH"TW" FE
ET"TX" INCHES":PRINT#-2,TAB(20)"
LENGTH"TL" FEET"TY" INCHES":PRIN
T#-2,TAB(20)"DEPTH"TH" FEET"TZ"
INCHES":PRINT#-2
1075 PRINT#-2,TAB(20)"TOTAL CUBI
C YARDS REQUIRED: ";:PRINT#-2,US
ING"###.##";VCU
1080 GOTO 760
1085 GOSUB920:PRINT#-2,TAB(20)"F
LOOR TILE CALCULATIONS: "+RM$:PR
INT#-2
1090 PRINT#-2,TAB(20)"MAIN AREA
"WM"BY "LM"INCHES"
1095 IF A1$="Y" THEN PRINT#-2,TA
B(20)"ONE ADD-ON"AW" BY"AL" INCH
ES":IF A2$="Y"THENPRINT#-2,TAB(2
0)"OTHER ADD-ONS"BW" BY"BL" INCH
ES"
1100 IF A3$="Y" THENPRINT#-2,TAB
(20)"ONE CUTOUT"CW" BY "CL" INCH
ES":IF A4$="Y" THEN PRINT#-2,TAB
(20)"OTHER CUTOUTS"CX" BY"WX" IN
CHES"
1105 PRINT#-2,TAB(20)"USING"TL"
INCH TILES,":PRINT#-2,TAB(20)"YO
U WILL NEED"INT(TN)+1" TILES":PR
INT#-2,STRING$(5,13)
1110 INPUT"HIT <ENTER> FOR MENU"
;PE:GOTO 30
1115 PRINT#-2,TAB(20)"WALL HEIGH
T: "+HA$+" FEET "+HB$+" INCHES":
PRINT#-2,TAB(20)AZ;:PRINT#-2," W
ALLS "+WF$+" FEET "+WI$+" INCHES
":PRINT#-2,TAB(20)AX;:PRINT#-2,"
 WALLS "+WG$+" FEET "+WJ$+" INCH
ES"
1120 PRINT#-2,TAB(20)WN" REGULAR
 WINDOWS":PRINT#-2,TAB(20)OQ" PI
CTURE WINDOWS":PRINT#-2,TAB(20)D
R" DOORS"
1125 PRINT#-2:RETURN
1130 PCLS:PRINT"GOOD LUCK!":END
1135 PRINT"ADD-ONS":PRINT:RETURN
1140 PRINT"CUTOUTS":PRINT:RETURN
1145 CLS0:FORS=10TO53:SET(S,7,4)
:SET(S,14,3):NEXT
1150 FORS=7TO14:SET(9,S,8):SET(5
4,S,8):NEXT
1155 PRINT@133,"    COCO-HANDIMA
N      ";:PRINT@165,STRING$(22,25
5);:PRINT@197,"   BY LEONARD HYR
E    ";
1160 FORTI=1TO7:POKE359,57:SCREE
N0,1:PLAY"V21T5505EDC":POKE359,1
26:SCREEN0,0:PLAY"V21T5503EDC":N
EXT TI
1165 FOR TI=1TO600:NEXT:PRINT@48
6,"<C> 1986 CAMBRIDGE MD";:FORTI
=1TO600:NEXT:RETURN
```

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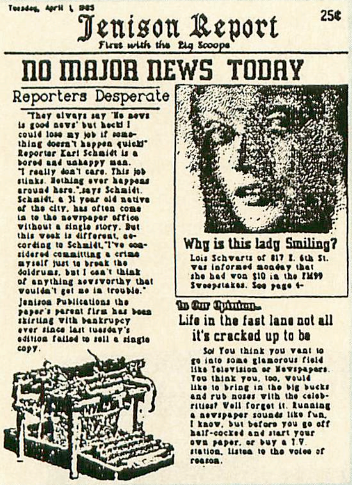
Look at what thousands of people are doing with CoCo Max:

Note: all the pictures below are unretouched screen photos or printouts (Epson RX-80).



Tuesday, April 1, 1985

Jenison Report

25¢

First with the Big Scoops

NO MAJOR NEWS TODAY

Reporters Desperate

"They always say 'No news is good news' but heck! I could lose my job if something doesn't happen quick!" Reporter Karl Schmidt is a bored and unhappy man. "I really don't care. This job stinks. Nothing ever happens around here." says Schmidt. Schmidt, a 31 year old native of the city, has often come in to the newspaper office without a single story. But this week is different, according to Schmidt. "I've considered committing a crime myself just to break the doldrums, but I can't think of anything newsworthy that wouldn't get me in trouble." Jenison Publications the paper's parent firm has been skirting with bankrupcy ever since last tuesday's edition failed to sell a single copy.

Why is this lady Smiling?

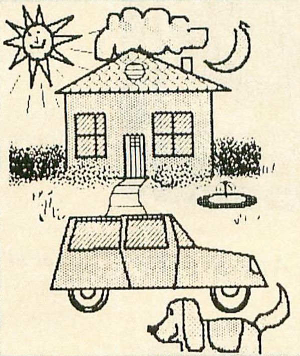
Lois Schwarts of 817 E. 6th St. was informed monday that she had won $10 in the FM99 Sweepstakes. See page 4-

In Our Opinion

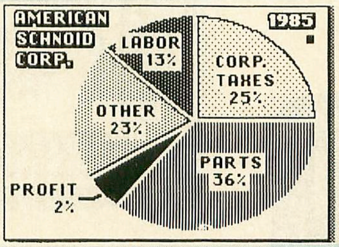
Life in the fast lane not all it's cracked up to be

So! You think you want to go into some glamorous field like Television or Newspapers. You think you, too, would like to bring in the big bucks and rub noses with the celebrities? Well forget it. Running a newspaper sounds like fun, I know, but before you go off half-cocked and start your own paper, or buy a T.V. station, listen to the voice of reason.

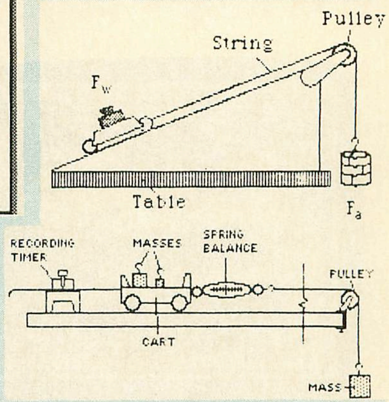
Publish a newsletter or bulletin; generate flyers.



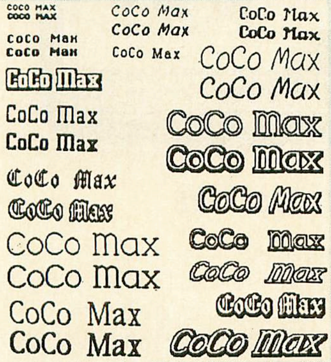
Fun for children, (from age 3!) while stimulating creativity.



Business graphs, charts, diagrams. Also memos, presentions, and report covers.


Pulley
String
F_w
Table
F_a
RECORDING TIMER
MASSES
SPRING BALANCE
PULLEY
CART
MASS

Junior's homework and science projects. Term papers too!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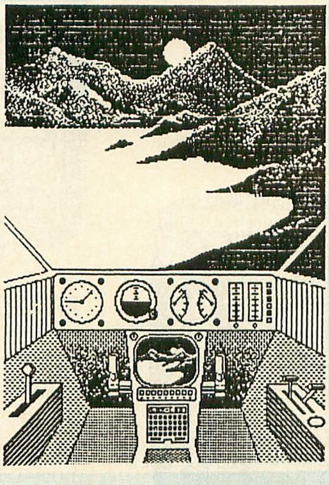
Over 200 typestyles to choose from!

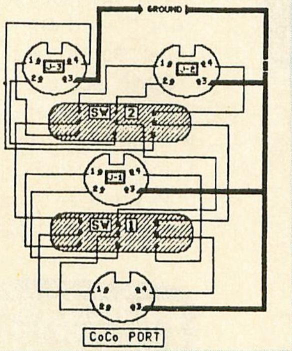
Printer Drivers included with CoCo Max II

Epson MX, RX, FX and LX series, Gemini, Star, Micronix, Delta 10, 10X, 15, 15X, SG-10, Okidata 82A, 92, 93, C. Itoh Pro-writer, Apple Image-writer, HP Thinkjet, Radio Shack DMP 100, 105, 110, 120, 200, 400, 500, Line Printer 7, Line Printer 8, TRP-100, CGP-220. (DMP-130 use Line Printer 8), PMC, Gorilla Banana.
Color printing: CGP-200, CGP-115

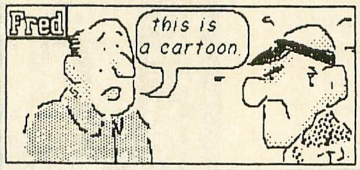


A new way to express your imagination.

For more information on CoCo Max, turn the page.


GROUND
J-3
J-2
SW 2
J-1
SW 1
CoCo PORT

Design work, such as schematics, floor plans,


Fred
this is a cartoon.

This is a cartoon.

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COCO MAX
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COLORWARE

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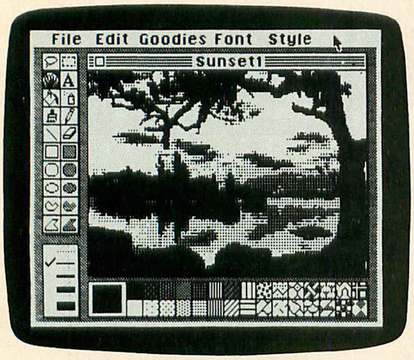
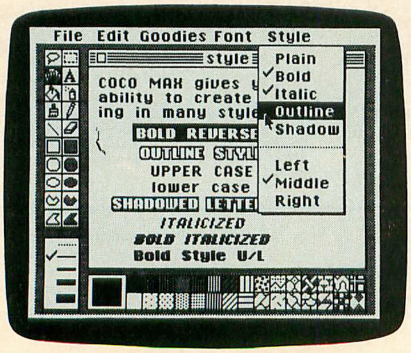
CoCo Max

This is one of those rare programs that will captivate everyone in your family.... No one can see CoCo Max and not want to try it!


File Edit Goodies Font Style
Sunset1

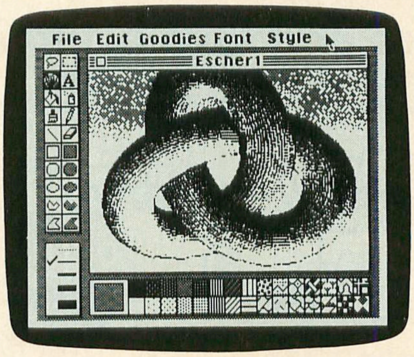
We are all witnessing an exciting revolution in microcomputers: a radically new kind of computer and software that opens a whole new world of creative power to computer users.

It was inevitable that this exciting approach would be brought to the CoCo. With this in mind, Colorware chose to go all out and maximize this new concept for the color computer. That meant designing not just software but hardware too. It meant thousands of hours of pure machine language programming. Rarely has this much effort been applied to one product for the Color Computer.


File Edit Goodies Font Style
style
Plain
✓Bold
✓Italic
Outline
Shadow
Left
✓Middle
Right

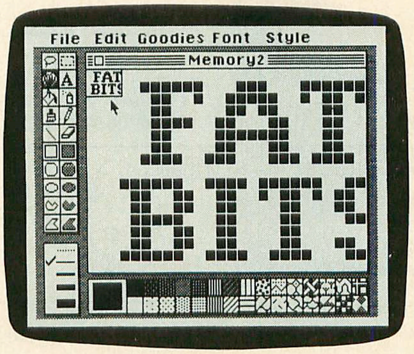
COCO MAX gives y
ability to create
ing in many style

BOLD REVERSE
OUTLINE STYL
UPPER CASE
lower case
SHADOWED LETTE
ITALICIZED
BOLD ITALICIZED
Bold Style U/L


File Edit Goodies Font Style
Escher1

UNMATCHED CAPABILITY...

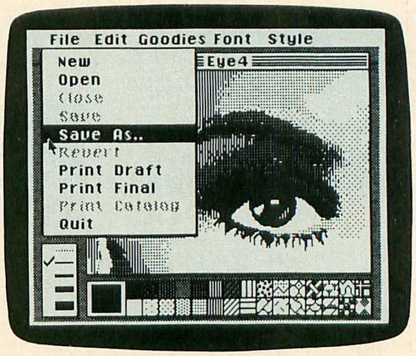
Because we took the maximum approach: highly optimized machine code combined with hardware, CoCo Max truly stands above the rest as the ultimate creative tool for the Color Computer. It's unrivaled performance lets you create with more brilliance and more speed than any similar system – much more than you ever imagined possible. And, you can do it in black & white or color.


File Edit Goodies Font Style
Memory2
FAT BITS
FAT
BITS

All the sophisticated power of the bigger systems is there: *Icons, Pull-Down Menus,* full *Graphic Editing, Font Styles,* and all kinds of handy tools and shortcuts.

Plug your joystick, mouse or touch pad into CoCo Max's Hi-Res Input Unit. Then use a delightfully simple *Point-and-Click* method to get any of CoCo Max's powerful graphic tools. It has them all:

You can *Brush, Spray* or *Fill* with any *Color, Shading* or *Pattern.* Use *Rubber Band Lines* and *Shapes* (square, rectangle, circle, elipse, etc.) to create perfect illustriations with speed and ease. There's a *Pencil,* an *Eraser* and even a selection of *Caligraphy Brushes.* And, as you can see, CoCo Max can do a lot with text. All of the newest special effects are there: *Trace Edges, Flip, Invert, Brush Mirrors,* etc. And all of the very latest super-capabilities like: *Undo,* which automatically reverses your mistakes, and *Fat Bits* which zooms you way in on any part of your subject to allow dot-for-dot precision.


File Edit Goodies Font Style
Eye4
New
Open
Close
Save
Save As..
Revert
Print Draft
Print Final
Print Catalog
Quit

THE BIG PICTURE

The large image box in the middle of the CoCo Max screen is actually only a window on an even larger image. Use the Point-and Click "Hand" to effortlessly move your window over any portion of the larger image. You have a working area of up to 3-½ times the area of the window itself.

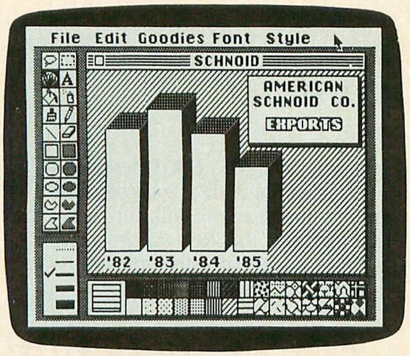
FLEXIBLE PRINTING...

CoCo Max gives you many ways to print. Fill a whole page with your image or condense two full CoCo screens to less than ¼ page for a finely detailed copy. "Dump" your CoCo Max screen full size or shrink it to ⅛ page size.

THE COCO MAX SYSTEM

FREEDOM TO CREATE...

Anyone who wants to create anything at all on their CoCo screen or printer will certainly be very glad to meet CoCo Max. CoCo Max's friendly yet sophisticated graphic and text capabilities let you almost instantly produce illustrations, diagrams, charts, graphs, and computer art – for serious use or just for creative fun.

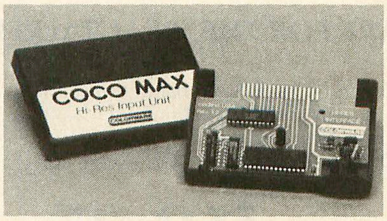


AN ABSOLUTE GUARANTEE

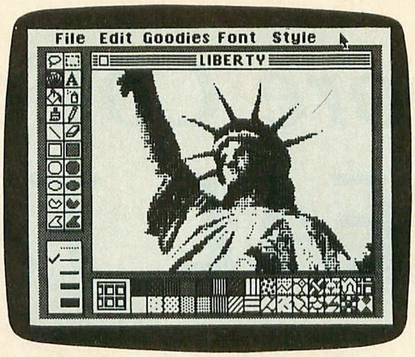
CoCo Max is a hardware/software system that no software-only system can match. Get CoCo Max and see your CoCo perform as it never could before. If you don't agree that CoCo Max is the ultimate creative tool for the Color Computer, simply return it within 20 days for a full, courteous refund from Colorware.

THE HARDWARE...

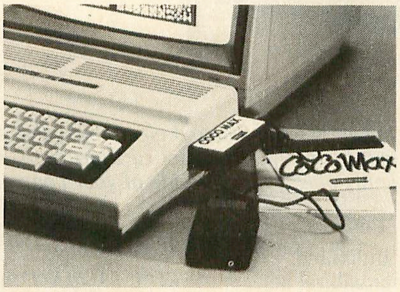
This is the key to CoCo Max's unmatched performance. Did you know the normal joystick input built into the Color Computer only allows access to 4,096 (64 x 64) points on the CoCo screen? Yet, the Color Computer's high resolution screen has 49,152 (256 x 192) pixels. This means that a joystick, mouse or even a touch pad can, at best, only access about one tenth of the pixels on the CoCo screen.



Most graphic programs ignore this hardware limitation of the Color Computer and give you only low-res control. Others attempt to overcome the limitation by using software schemes such as sliding windows. Although clever, these schemes yield sluggish and awkward results. Only CoCo Max does it the right way. The CoCo Max Hi-Res Input Unit plugs into your ROM slot and adds an entirely new joystick input to your computer – a precision one with a 49,152 point resolution to match the CoCo screen exactly.

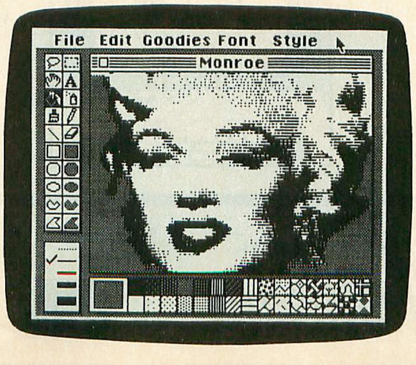


Plug your same joystick, mouse or touch pad into this new input and you have a whole new kind of control. The difference is remarkable.

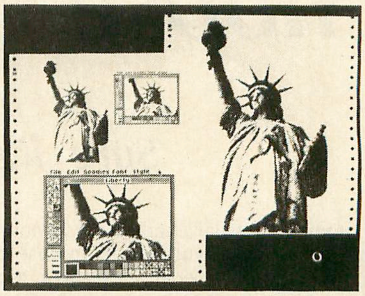


A DIGITIZER OPTION...

We studied all the video digitizers available and picked the best of them to link with CoCo Max. The DS-69 from Micro Works was our choice. This optional device lets you capture the image from any video source (video recorder, camera, etc.) on your Color Computer.



You may then use CoCo Max's graphic magic on it. The DS-69 is available as an option from Colorware from $149.95 complete with its own software on disk or tape. Using the DS-69 with a disk requires an RS multi-pak adaptor.



COCO MAX REQUIREMENTS

The CoCo Max System includes the Hi-Res Input Unit, software on disk or cassette (please specify) and user manual. It will work on any 64K Extended or non-extended Color Computer. You'll need a Radio Shack or equivalent joystick, mouse or touch pad. Disk systems require a Multi-Slot Interface or Y-Branching Cable.

THE COMPLETE COCO MAX SYSTEM, with software on *DISK*........... ***$69.95***

with software on *CASSETTE* (Available Mar '85)......................... ***$69.95***

Y-BRANCHING CABLE-If you have a disk system but do not have a Multi-Slot Interface, use this economical 40-pin, 1 male, 2 female cable to connect the CoCo Max Hi-Res input unit and your disk controller to your CoCo..... ***$27.95***

Sorry, COCO MAX is not compatible with JDOS

COLORWARE

Colorware Inc.
78-03F Jamaica Ave.
Woodhaven, NY 11421
(718) 647-2864

VISA
MasterCard

ORDERING INFORMATION

ADD $3.00 PER ORDER FOR SHIPPING AND HANDLING.
C.O.D.'S ADD $3.00 EXTRA.
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Why do more CoCo owners choose 'REAL TALKER'?

Sure it's priced right, but there's more...

Thousands of 'Real Talker' owners know 'Real Talker' beats ALL other Coco voice synthesizers in ease of use and flexibility. And, NO other Coco talker has a clearer, more intelligible voice. That's quite a lot of advantage when you consider Real Talker's unbeatable price. Yet, Real Talker has some important features that you simply will not find in other Coco talkers:

'Real Talker' is compatible with any 16K, 32K, 64K Extended or non-extended Color Computer. It works with any cassette or disk system and comes complete and ready to talk through your T.V. or monitor speaker. Price includes the 'Real Talker' electronic voice synthesizer in a ROM pack, software on cassette (may be transferred to disk), and user manual.

'SAY' command - You'll have your computer talking brilliantly in just minutes thanks to this powerful new command. Type SAY "ANYTHING YOU WANT" and your words are instantly spoken. It's that simple. Think how easy this makes creating speaking Basic programs. Adding speech to your existing programs is a snap too.

'CONVERT' - This is a truly powerful command for the basic programer. CONVERT automatically transforms a machine language dependent speaking program into a stand-alone Basic program. In other words, you can effortlessly write speaking Basic programs that do not require a machine language translator in memory. This is a unique feature of 'Real Talker'. No other voice synthesizer gives you anything even remotely approaching this type of capability - even synthesizers costing considerably more.

COLORWARE
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INSTRUCTION
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'Real Talker' is a full-featured electronic voice synthesizer unit built into a compact cartridge case. You simply plug it into the side of your computer.

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1. ***'DR. TALK***-This interactive "Eliza" type psychoanalyst program will discuss your innermost problems at length.
2. ***'TALKING BATTLESHIP'***-It's you vs. the computer in this speaking version of the classic game.
3. ***'TALKING BLACKJACK'***- Play for big stakes against a rather talkative casino dealer.

ONLY

$59.95

Other features include software controlled pitch, unlimited vocabulary text-to-speech, and even a program that will recite any ASCII file (such as from Telewriter-64 & other word processors). You also get Colorware's unique full-screen phoneme editor program that let's you experiment with and modify speech at it's most fundimental level.

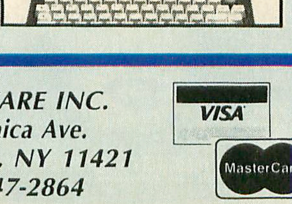
'REAL TALKER-1' (for the original Color Computer)...............***$59.95***

'REAL TALKER-2' (for the Color Computer-2)..........................***$64.95***

'Y - BRANCHING CABLE' For disk systems. If you have a disk system but do not have a Radio Shack Multi-Slot unit, this economical cable will allow to connect and use your Real Talker and Disk system together...................................***27.95***

TALKHEAD

If you have a 'Real Talker', do not deprive yourself of this absolutely incredible machine-language Talking Head simulation program. While other talking head simulations use a minimal cartoon-like face, TALKHEAD uses high resolution, full-screen, digitized images of an actual person's face to create a life-like animated effect.



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WE ACCEPT VISA, MASTER CARD, M.O.'S, CHECKS.
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CoCo Community

We have compiled a list of Color Computer Clubs because of the many requests we have received. CoCo Clubs may wish to exchange newsletters, share ideas for topics of discussion at monthly meetings, etc.

Please let us know if we have omitted any clubs and send us complete up-to-date addresses. Only those clubs that have signed our "agreement form" will appear in this listing of CoCo Clubs. Also, please notify us if you wish to add or delete any names on this list. Send your information to:

CoCo Clubs
THE RAINBOW
The Falsoft Building
P.O. Box 385
Prospect, KY 40059

ALABAMA

Birmingham Alabama Color Computer Club, Robert Matthews, 3529 Laurel View Lane, Birmingham, 35216, (205) 933-0887

Huntsville Color-80 Users Group, Jerry Crawford, 15001 Glory Dr., Huntsville, 35803, (205) 881-9698

ALASKA

Alaska Color Computer Users' Group, Rick McDannel, 430C Beluga Ave., Ft. Richardson, 99505, (907) 428-0392

ARIZONA

Huachuca Hot Pokers, James Standley, 235-A Jeffords Street (NBU-96H), Ft. Huachuca, 85613, (602) 458-8338

Tucson Color Computer Club, Marshall R. Madole, 3721 S. Le Beaux Place, Tucson, 85730

ARKANSAS

N.W. Arkansas Color Computer Club, Rebecca Cravens, P.O. Box 131, Bentonville, 72712, (501) 631-1807

Central Arkansas CoCo Club, Melinda Braslovsky, 1203 Erving Rdg., LP Cabot, 72023, (501) 982-8854

CALIFORNIA

California Computer Federation, (Sacramento Chapter), Mike Faulkin, 828 San Tomas Drive, David, 95616

California Computer Federation, (San Fernando Valley Chapter), Jim Sutemeier, 9565 Reseda Blvd., #324, Northridge, 91324, (818) 993-5217

California Computer Federation, (San Francisco Chapter), Dick Stanich, P.O. Box 7007, Redwood City, 94063, (415) 366-4560, BBS (415) 364-2658

Color America Users Group, Mark Randall, 2227 Canyon Rd., Arcadia, 91006, (213) 355-6111

Los Angeles-Wilshire Color Computer Users' Group, Norm Wolfe, P.O. Box 11151, Beverly Hills, 90213

The Davis CoCoNuts, Adam Sherman, 1818 Haussler Dr., Davis, 95616, (916) 758-3195

Sacramento Color Computer Club, Wayne Chrisope, P.O. Box 9, Elverta, 95626

North American CoCo - Orange County, Eric Wilson, 8405 Sweetwater Circle, Huntington Beach, 92646, BBS (714) 847-2268

Joe Bennett, 1169 Florida Street, Imperial Beach, 92023, (474-6213)

CoCoholics and Tandy Computer Club, Kenneth M. Denny, 801 W. Roseburg Ave., Suite 200, Modesto, 95350, (209) 523-5176

Ventura County Color Computer Club (VC4), John Bascue, Oxnard Public Library, 214 "C" Street, Oxnard, 93030, (805) 987-4752 or DATA (805) 484-5491

Sacramento CoCo Club, Charles Doughty, Box 60511, Sacramento, 95860

Salinas Color Computer Club, Larry Livingston, 501 Monterey Highway, Salinas, 93908, (408) 484-9697

Citrus Color Computer Club, Joseph Kohn, P.O. Box 6991, San Bernadino, 92412, (714) 792-8721

The MC-10 Newsletter Club, Jose J. Bray, 4730 Cass Street, San Diego, 92109, (619) 483-8744

Local Color—A CoCo Club of San Francisco, Andrew G. Kieval, P.O. Box 421242, San Francisco, 94142

San Joaquin CoCo Club, Steven Paul Moreno, P.O. Box 99024, Stockton, 95209, (209) 951-3938

Silicon Valley Color Computer Club, Shawn Jipp, P.O. Box 61593, Sunnyvale, 94088, (408) 749-1947

CoCo Nutz Computer Club, Walter V. Seay, 68-461 Highway 86, Thermal, 92274, (619) 397-4252

Conejo Color Computer Users Group, Robert S. Rimmer, 472 Sundance Street, Thousand Oaks, 91360, (805) 492-4972

South Bay Color Computer Club, Karen Schlotzhauer, 23113 Dana Ave., Torrance, 90501, (213) 539-2539

COLORADO

Lowry Microcomputer Club/CoCo Users' Group, Jerry D. Surritte, 2249 Moline St., Aurora, 80010, (303) 343-3273

The ESCO Computer Club, David E. Schulz, 1299 Harrison Street, Denver, 80206, (303) 388-6988

Colorado Color Computer Club, Joe Applegate, P.O. Box 33492, Northglenn, 80233, (303) 650-9768

FLORIDA

Northwest Florida CoCo Nuts, William N. Lamb, P.O. Box 1032, Fort Walton Beach, 32549, (904) 244-5281

Alachua County CoCo Special Interest Group, Chris Meyers, P.O. Box 14927, Gainesville, 32604, (904) 378-9598

Jacksonville Color Computer Club, William H. Brown III, 2411 Hirsch Ave., Jacksonville, 32216, (904) 721-0282

CoCo Chips Color Computer Club, 6 Belle Mead Circle, Largo, 33540, (813) 581-7779

Broward County Color Computer Club, Timothy D. Neary, 510 S.W. 64th Ave., Margate, 33068, (305) 972-4074

South Brevard Color Computer Club, Benjamin S. Jerome, 496 Hillside Court, Melbourne, 32935, (305) 259-4609

The Naples CoCo Club, Matt Tari, 3320 7th Avenue S.W., Naples, 33964, (813) 455-4830

Color-6809 Users Group, Emery Mandel, 4301 11th Avenue North, St. Petersburg, 33713, (813) 323-3570

C.C. Club of Sarasota, Ernie Bontrager, 4047 Bee Ridge Rd., Sarasota, 33582, (813)921-7510

Broward CoCo Club, Sue Spahn, 11950 N.W. 29th Manor, Sunrise, 33582, (305) 741-4737

IDAHO

CoCo Questers, Scott Bellman, 2420 Salem Court, Bettendorf, 52722, (319) 359-7702

CoCo-AG Farm Computer Users Group, Kelly Klass, Rt.1, Box 4133, Twin Falls, 83301, (208) 733-4251

ILLINOIS

Town & Country CoCo, 5461 S. Kenwood, Chicago, (312) 493-3748

Cook County Color Computer Club, Tim Powers, 1633 Fifth Ave., Chicago Heights, 60411, (312) 747-7062

Peoria Color Computer Club, Harold E. Brazee, 102 Twin Oaks Court, East Peoria, 61611, (309) 694-4703

Illinois Color Computer Club of Elgin, Steven Stroud, 1098 Florimond Dr., Elgin, 60120, (312) 695-3186

Glenside Color Computer Club, Ed Hathaway, 8 W. Stevenson Drive, Glendale Heights, 60139, (312) 462-0694

Kitchen Table Color Computer Group, Robert Mills, P.O. Box 464, Hanover, 61041, (815) 591-3377

Northern Illinois Color Computer Club, 580 Milton Lane, Hoffman Estates, 60194, (312) 885-2573

Motorola Microcomputer Club, Steve Adler, 1301 Algonquin Rd., Schaumburg, 60196, (312) 576-3044

Chicago OS-9 Users Group, 480 Gilbert Drive, Wood Dale, 60191, (312) 860-2580

INDIANA

Evansville Color Computer Users Group, Dave Jenkins, 1418 E. Illinois Street, Evansville, 47711, (812) 424-0099

Three Rivers Users Group, George Barber, 2410 New Haven Ave., Fort Wayne, 46815

Indy Color Computer Club, Mike Davis, P.O. Box 68702, Indianapolis, 46268, (317) 257-3300

Southern Indiana Computer Club, Route 1, Box 459, Mitchell, 47446

CoCo Program, Erik Merz, 310 Appletree Dr., Noblesville, 46060, (317) 842-1340

IOWA

Metro Area Color Computer Club, K.L. Knudtzon, 3324 11th Ave., Council Bluffs, 51501

Mid Iowa CoCo, Terry Simons, 1328 48th Street, Des Moines, 50311, (515) 279-2576

Dubuque Tandy Users Group, Wesley Kullhem, 1995 Lombard, Dubuque, 52001, (319) 556-4137

Iowa City TRS-80 Users Group, Susan Chapler, R.R. 6, The Woods, Iowa City, 52240, (319) 351-5959

KANSAS

KC CoCo Club, Gay Crawford, P.O. Box 11192, Kansas City, 66111, (913) 764-9413

Topeka Color Computer Club, Kevin Cronister, 2224 Hope, Topeka, 66614, (913) 272-1353

Color Computer Club of Wichita, Rex Rivers, 1205 N. Mosley, Wichita, 67214, (316) 264-9193

Walnut Valley C.C. Users Club, David Anderson, 1212 E. 4th St., Winfield, 67156, (316) 221-0040

KENTUCKY

Perry County CoCo Users Group, Keith W. Smith, General Delivery, Hardburly, 41747, (606) 439-4209

LOCO-COCO, Mike Standefer, 3141 Doreen Way, Louisville, 40220, (502) 458-6690

LOUISIANA

Red Stick Color Computer Club, Gary Cash, 8929 Metairie Drive, Baton Rouge, 70810, (504) 293-7799

Cajun CoCo Club, Bob Hoevel, 104 Karen St., New Iberia, 70560, (318) 365-7706

MASSACHUSETTS

Greater Boston Super Color Users Group, Robert Biamonte, 6 Boulder Drive, Burlington, 01803

New England C.C. Users Group, Christopher E. Sweet, R.D. 2, Box 261, Harvard, 01451, (617) 456- 8291

Massachusetts CoCo Club, Jason Rahaim, Spring St., Lunenberg, 01462, (617) 582-6514

CLUB 6809, Jean Salvas, 204 East Street, Springfield, 01104, (413) 734-5163

MICHIGAN

Petoskey Area CoCo Club (PAC^3), Dennis Hoshield, 670 Liegl Drive, Alanson, 49706, (616) 347-0607

Color C.H.I.P.S., Jack Pieron, 3175 Oakhill Place, Clarkston, 48016, (313) 627-4358

CCUG (Color Computer Users Group), Rich Van Maner, O-599 Lake Michigan Drive, Grand Rapids, 49504, (616) 453-6695

Grand Rapids Area Tandy Users Group, Robert M. Worth, Jr., 1726 Millbank S.E., Grand Rapids, 49508 (616) 245-9324

Greater Lansing Color Computer Users Group, P.O. Box 14114, Lansing, 48901

Midland C.C. Club, Neil Drake, 709 Coolidge, Midland, 48640, (517) 631-2939

The Greater Kalamazoo Color Computer Club, Mike Marcelletti, P.O. Box 265, Paw Paw, 49079, (616) 657-3850

Michiana CoCo Club, Clay Howe, 310 S. Jefferson St., Sturgis, 49091, (616) 651-4248

MISSISSIPPI

Singing River C.C. Club, Mark Welch, 3605 Vancleave Rd., # 118, Gautier, 39553

Gulf Coast Color Computer Assoc., Ed Keels, 22 Christy Cove, Gulfport, 39503, (601) 832-1210

CoCo Art Club, Joel Bunyard, Rt. 7, Box 10, Meridian, 39301, (601) 483-0424

MISSOURI

North County 80 Group, Tom Vogel, 12 Ville Donna Ct., Hazelwood, 63042, (314) 739-4078

Mid-America Color Computer User's Group, Jerry Morgon, 807 Ponca Drive, Independence, 64056, (816) 796-5813

Coconuts, 1610 N. Marlan, Springfield, 65803

MONTANA

Billings C.C. Club, Jayne Kenyon, 4306 Phillip, Billings, 59101

NEBRASKA

TRS-80 Color Computer Users Group of Lincoln, Jonathan Skean, 2629 South 15th St., Lincoln, 68502, (402) 475-9815

Siouxland Color Computer Club, Alan Pedersen, 611 D Street, South Sioux City, 68776, (402) 494-2284

NEVADA

C.A.T. F.U.N., Paul A. Osborne, 201 Miners Road, Fallon, 89406, (702) 423-5789

NEW JERSEY

Intrasoft, Ravi Sakaria, 139 Candace Lane, Chatham Township, 07928, (201) 635-8025

The Kid CoCo Club, Derrick Kardos, 11 Regal Drive, Colonia, NJ 07067, (201) 382-6862

Bug 80 Users' Group, George R. Miller, Jr., Box 62, Glen Gardner, 08826

Garden State Color Computer Users Group, Darren Nye, 5 North 20th Ave., Manville, 08835; Voice (201) 725-8385, Data (C.C.I.E. BBS) (201) 725-5028

CoCo Club of W. Orange, Gregg Favalora, 12 Blackburne Terrace, W. Orange, 07052, (201) 736-1748

Loco CoCo Club, Bud Lavin, 73B Wavercrest Ave., Winfield Park, 07036

NEW MEXICO

Chaves County Color Computer Club, Lee Mitchell, 1102 Melrose Drive, Roswell, 88201, (505) 623-0789

NEW YORK

Adirondack CoCo Club (Albany Chapter), Ron Fish, Box 4214, Albany, 12204

Adirondack CoCo Club, (Athens Chapter), Pete Chast, P.O. Box 61, Athens, 12015

Adirondack CoCo Club (Glens Falls Chapter), Dave and Richard Mitchell, 39 Center St., Fort Edwards, 12828

Queensboro Color Computer Club, Bob Rosen, Springfield Blvd. & 56th Ave., Bayside, 11364, (212) 631-6233

Island Color Computer Club, Charles Martin, P.O. Box 901, Bellmore, 11710

Broome CoCo Club, Bucky Helmer, 57 Front St., Binghampton, 13905

Kings Byte CoCo Club, Morty Libowitz, 1063 East 84th St., Brooklyn, 11236, (718) 763-4233, BBS (718) 837-2881

C.C. Club of Central N.Y., Joseph Short, 248 S. Fourth Ave., Ilion, 11357, (315) 895-7730

Rockland County Color Computer Users Group, John S. Scibran, P.O. Box 131, Monsey, 10952, (914) 357-5580

Olean Area CoCo Users Group, Herman L. Smith, P.O. Box 216, Olean, 14760, (716) 372-1170 or 372-3121

The CoCo Clan, John David, 56 Willowwood Lane, Staten Island, 10308, (718) 317-6228

New York Color Computer User Group, Carl Glovinsky, 15 Bolivar St., Staten Island, 10314, (718) 761-0268

NORTH CAROLINA

TRS-80 Users' Group of Charlotte, Jason Foodman, 240 Medearis Dr., Charlotte, 28211

Bull City CoCo Users Group, Todd Wall, 5319 Durand Drive, Durham, 27703, (919) 598-1348

Raleigh Color Computer Club, David Roper, P.O. Box 680, Garner, 27529

NORTH DAKOTA

Musica 2 Users Group (MUG), Solveig Pederson, 711 3rd Street S.E., Valley City, 58072, (701) 845-5063

OHIO

CoCo Club of Youngstown, Timothy McFadden, P.O. Box 478, Canfield, 44406, (216) 788-4218

Columbus & Central Ohio Color Computer Club, D.E. Sparrow, 19 E.N. Broadway, Columbus, 43214, (614) 268-5366

Dayton CoCo Users' Group, Steve Lewis, 4230 Cordell Dr., Dayton, 45439

Cincinnati TRS-80 Users Group, R.A. White, 44 Dow Court, Fairfield, 45014

Dayton Are Color Computer Users Group, David R. Barr, 2278 Yorkshire Pl., Kettering, 45419, (513) 293-2228

M.U.G. of CoCo—Middletown Users Group, James Carr, Middletown, 45042, (513) 424-6905

Greater Toledo Color Computer Club, Ronald L. Hall, 9646 Garden Road, Monclova, 43542, (419) 865-3663

Northeastern Ohio (N.E.O.) CoCo Club, Tony Rugue, 527 Malvern Drive., Painsville, 44077, (216) 354-2736

Tri-County Computer Users Group, William J. Loeffler, 2612 Dale Avenue, Rocky River, 44116, (216) 356-0779

Miami Valley CoCo Club, R. Douglas Wales, 2065 LeFeure Rd., Troy, 45373

OKLAHOMA

CoCo Inc., Robert L. Pace, 1726 W. Rose Oak Dr., Mustang, 73064, (405) 376-3569

OREGON

Willamette Valley CoCo Users, Brian James, P.O. Box 11468, Eugene, 97440, (503) 687-9286

PENNSYLVANIA

HUG-A-CoCo, George Lurie, 2012 Mill Plain Court, Harrisburg, 17110, (717) 657-2789

Penn-Jersey Color Computer Club, P.O. Box 2742, Lehigh Valley, 18001

CAPATUG, Inc., 340 Lewisberry Rd., New Cumberland, 17070, BBS (717) 774-6543

Skyline Color Computer Club of Berks County, Lewis F. Brubaker, 4874 Eighth Ave., Temple, 19560, (215) 921-3616

Pittsburgh Color Group, Ralph Marting, P.O. Box 351, West Mifflin, 15122, (412) 823-7607

William Tucker, P.O. Box 351, West Mifflin, 15122, (412) 466-3078

RHODE ISLAND

New England CoCo Nuts, P.O. Box 6604, Providence, 02940

SOUTH CAROLINA

LoCo CoCo Club, L.W. Coyle, 4334 Flynn Drive, Charleston Heights, 29405, (803) 747-0802

Invitation Software Group, Tom Reed, 3562 Linbrook Dr., Columbia, 29204, (803) 786-0541

Midlands 80 Computer Club, Tommy Sanders, P.O. Box 7594, Columbia, 29202, BBS (803) 755-3414

Metropolitan Greenville CoCo Club, Ed Lowe, P.O. Box 6, Gray Court, 29645, (803) 876-3928

Hilton Head Island CoCo Club, Kevin Clark, P.O. Box 6187, Hilton Head Island, 29928, (803) 785-9630

Spartanburg County CoCo Club, Dennis Shattuck, 473 Royal Oak Drive, Spartanburg, 29302, (803) 583-3017

TENNESSEE

Chattanooga CoCo Club, Jim Perkins/Jim Cox, P.O. Box 9825, Chattanooga, 37412, (615) 870-2439

Tri-Cities Computer Club, Gary Collins, P.O. Box 4506 CRS, Johnson City, 37602-4506, (615) 929-1862

Foothills Micro-Computer Club, Ron Williams, P.O. Box 1541, Maryville, 37801, (615) 984-4287

Memphis Color Computer Users Group, Ben Barton, 4903 Warrington Rd., Memphis, 38118, (901) 795-7075 or 362-5945

TEXAS

CoCo User Group, David Karam, 1809 Dexter, Austin, 78704, (512) 442-6317

B/CS Color Computer Users Group, Dale Cuthbertson, 1812 Michael Lane, Bryan, 77801, (409) 822-0731

Deer Park Color Computer Club, Donald Burr, 4314 W. Grant, Deer Park, 77536, (713) 479-5313

International Color Computer Club, Inc., Robert L. Garrett, 2101 East Main Street, Henderson, 75652, (214) 657-7834

TRS-80 Users Group of New Braunfels, John Mendez, 408 Acorn, New Braunfels, 78130, (512) 629-3207

The San Antonio Color Computer Club, James Leatherman, 2430 Rawhide Lane, San Antonio, 78227, (512) 674-4294

UTAH

Ogden CoCo, Kathy Rush, 4535 S. 2600 W. Roy, Ogden, 84067

Salt City CoCo Club, Dennis Mott, 720 E. Browning Ave., Salt Lake City, 84105, (801) 487-6032

VIRGINIA

Northern Virginia C.C. Club, Bruce Warner, 14503 Fullerton Road, Dale City, 22193, (703) 670-4962

Central Virginia Color Computer Club, Lane Lester, 413 Woodland Circle, Lynchburg, 24502, (804) 237-4188

WASHINGTON

Northwest Computer Club, Larry Haines, East 2924 Liberty, Spokane, 99207, (509) 483-5547

Mount Rainier Color Computer Club, Ron Amos, 2450 Lenore Drive N., Tacoma, 98406, (206) 752-8735

WEST VIRGINIA

Kanawha Valley Personal Computer Club, P.O. Box 5354, Charleston, 25311, BBS (304) 925-3338 or 345-6502

Mtn. State CoCo Users Group, Donald G. Barber, Jr., P.O. Box 1084, Morgantown, 26507, (304) 599-4493

Mil-O-Bar Computer Club, Jim LeMaster, P.O. Box 130, Ona, 25545, (304) 743-4752 after 4 p.m.

Blennerhassett CoCo Club, David Greathouse, Rt. 9, Box 119, Parkersburg, 26101

West Virginia Color Computer Club, William Mucklow, 949 Baier Street, St. Albans, 25177, (304) 727-6764

WISCONSIN

CoCo-MUG, Tom Fandre, P.O. Box 10152, Milwaukee, 53210, (414) 542-0600

Southern Wisconsin CoCo Club, David C. Buehn, P.O. Box 411, Twin Lakes, 53181

CANADA

ALBERTA

Calgary Color Computer Club, Don Towson, 832 Cannell Rd. S.W., Calgary, T2W 1T4, (403) 281-2855

Edmonton CoCo Users Group, Dexter Dombro, P.O. Box 4507 Stn. South, Edmonton, T6E 4T7, (403) 461-4750

Medley Computer and Electronics Club, P.O. Box 1267, Medley, T4A 2M0

BRITISH COLUMBIA

North Island CoCo Club, Ann Marie MacKay, P.O. Box 1740, Port Hardy, V0N 2P0

Salmon Arm CoCo, David Coldwell, 2981 N. Broadview, Salmon Arm, V0E 2T0, (604) 832-8247

MANITOBA

Winnipeg Micro-80 Users Group, Mel Seder, 884 Ash St., Winnipeg, R3N 0R9, (204) 284-0376

NEW BRUNSWICK

Color Computer Moncton Users Group (CoCoMUG), Leo Allain, 91 Woodland Dr., Moncton, E1E 3C4, (506) 382-2190

NEWFOUNDLAND

Avalon CoCo Club, A.R. Thompson, 10 Foran St., St. John's, A1E 4G1

NOVA SCOTIA

Halifax Dartmouth CoCo Users Group, P.O. Box 572, Dartmouth, B2Y 3Y9, (902) 469-3656

ONTARIO

ESSA Color Computer Club, Albert L. Ley, 40 Perry Street, Barrie, L4N 2G3, (705) 728-9481

International Adventurer's Club, Maurice Dow, 84 Camberley Cres., Brampton, L6V 3L4

K-W C.C. Club, Peter Karwowski, 23 Hudson Crescent, Kitchener, N2B 2V7

Kingston CoCo Club, Kenneth Bracey, 316 Westdale Ave., Apt. 4-C, Kingston, K7L 4S7, (613) 544-2806

London CoCo Nuts Computer Club, Harry K. Boyce, 180 Concord Road, London, N6G 3H8, (519) 472-7706

Meadowvale Color Computer Club, Howard Porter, P.O. Box 186, Streetsville, Mississauga, L5M 2B8

Niagara Regional CoCo Club, Harry VanDyke, 7707 Jubilee Drive, Niagara Falls, L2G 7J3

Ottawa 6809 Users Group, Norm Shoihet, 1497 Meadowbrook Road, Ottawa, K1B 5J9, (613) 741-1763

QUEBEC

Club d'Ordinateur Couleur du Quebec, Inc., Centre de Loisirs St-Mathieu, 7110- 8e Ave., St-Michel, Montreal, H2A 3C4, (514) 729-8467

South Shore CoCo Club, Jacques Bedard, 33 Lisilre, St-Constant, P.Q., J0L 1X0

Le Club Couleur du Nord, Gabriel Pigeon, RR 2, Ville Montel, J0Y 2S0, (819) 732-2346

SASKATCHEWAN

Regina Color Computer Club, Georges Glass, 26 Tweedsmuir Bay, Regina, S4X 2B1, (306) 949-3942

Saskatoon Color Computer Club, L. Curtis Boyle, 35 Bence Crescent, Saskatoon, S7L 4H9

AUSTRALIA

Blacktown City TRS-80 Colour Computer Users Group, Keith Gallagher, P.O. Box 264, Riverstone, New South Wales, 2765

HELF CoCo Users Group, Elvis Lazic, 27 Jensen Street, St. Marys, New South Wales, 2760

Color Computer Penrith User Group, Alexander Schofield, 15 Tasman Avenue, Lethbridge Park, New South Wales, 2770

The Hills District Color Computer Club, Andrew Rankin, 42 Lucas Road, Seven Hills, New South Wales, 2147, phone (02) 674-3741

CoCoHUG (Color Computer Hobart Users Group), Robert Delbourgo, 15 Willowdene Avenue, Sandy Bay, Hobart, Tasmania, 7005

ISRAEL

The First Color Computer Club of Israel, Yosef Krinsky, Data Processing Division, 1 Radin Street, Netanya, Israel

MEXICO

MEXCOCO Users Group, Sergio Waisser, Pachuca 87-109, Mexico City D.F., 06140, phone 553-11-98

WEST GERMANY

First CoCo Club Hamburg, Theis Klauberg, 2000 Hamburg 65, Op de Solt 53 a, West Germany

new clubs

Editor:

Where are the MC-10 users? If you have an MC-10 and want to use it, drop me a line at 10226 N. 29th Street, 33612. Let's get an MC-10 users group started!

H. Francisco
Tampa, FL

- We have approximately 80 members in the Atlanta Color Computer Users Group and have been in existence for three years. Meetings are the third Wednesday of the month at Nash Middle School in Cobb County at 7 p.m. Our newsletter is only $20 per year. For more information contact the club at 5155 Moroney Mill Road, 30134.

Terry E. Love
Douglasville, GA

- Our club is called CoCo Questers. We do print a newsletter. For more information please send an SASE to me at 2420 Salem Court, 52722.

Scott Bellman
Bettendorf, IA

- I would like to announce the start of the first club for TP-10 printer owners. The club is only $13 a year or $1.50 per month. Each month you get features — articles that you can write — free ads, comments and questions for the TP and three to nine useful and fun programs (all mailed to you on tape). For more information or a subscription, write TP-10 Club, 7632 Saddle Drive, 66502.

Tim Lehmann
Manhattan, KS

- The Tri-City Color Computer Club meets the third Saturday of every month at the Butman Fish Library, 1716 Hancock, Saginaw. There are no dues, although we do send a club newsletter. Write to me at 1806 34th Street, 48708.

Ron Sujkowski
Bay City, MI

- The Grand Rapids Area Tandy Users Group meets at Radio Shack Computer Center, 3142 28th Street S.E. on the third Tuesday of each month. Write to me at 1726 Millbank Street S.E., 49508 or call (616) 245-9324.

Robert Worth
Grand Rapids, MI

- Our club is called CCUG (Color Computer Users Group). Dues are $3 to cover the cost of our newsletter. Also send some public domain software as we are building up a library. Contact me at 559 Lake Michigan Drive, 49504.

Rich Van Monen
Grand Rapids, MI

- We have a club that meets on the first Tuesday of each month. There are no dues or fees. Call or write to me and I will be more than happy to answer any questions. My address is 611 D Street, 68776; phone (402) 494-2284.

Alan Pedersen
South Sioux City, NE

- Our group is a combination of users. The name CAT FUN stands for the Commodore, Apple, Tandy, Fallon Users Network. Send correspondence to P.O. Box 2155, 89406 or phone (702) 423-8001.

Paul A. Osborne
Fallon, NV

- I'd like to start a CoCo club for 16K owners only. Anyone interested who has a 16K (not Extended BASIC) computer write to me at 115 Evelyn Avenue, 12010.

J.R. Raczes
Amsterdam, NY

- If there is anyone in the Metrolina area interested in a CoCo club, please write me at Rt. 1, Box 720-9, 28115.

Jim Carroll
Morresville, NC

- The Tandy Color Computer Club of Minot, P.O. Box 1095, 58702. Call me at (701) 852-6651 for more information.

Pete Fettig
Minot, ND

- I'd like to start a club for CoCo owners to exchange ideas. Interested CoCoists can get a newsletter by sending a first class stamp to CoComug, 3735 Stark Street, 43906.

Charles D. Roman
Bellaire, OH

- Our club in Oklahoma City has about 280 members with about 125 at each meeting. We meet the second Saturday of the month at the Red Cross Building at 10th and Hedson at 9 a.m. For information write to me at 1726 W. Rose Oak Drive, 73064.

Robert L. Pace
Mustang, OK

- The LoCo CoCo Club meets on the last Tuesday of the month. Annual dues are $12 for a monthly newsletter. For more information write me at 4334 Flynn Drive, 29405, or call (803) 747-0802.

L.W. Coyle
Charleston Heights, SC

- I am interested in starting a users group in the Grand Prairie-Arlington area to share experiences with other owners of Tandy Color Computers. Contact me at (214) 246-4396 or write to 1026 Capetown Drive, 75050.

Albert J. Marks
Grand Prairie, TX

- We have put together a newsletter that is published 10 times a year. Send a letter that includes your name and address so we can send documentation to see if you are interested in signing up. Send to 5908 87th Street E., 98371.

Mark Bell
Puyallup, WA

- I started publishing a newsletter called "About My MC-10." I would share a sample issue for the postage. Forty-two pages of back issues and a 100-program software catalog are available for $5. The current year's subscription is $10 to cover postage and photocopy expenses. Write me at E. 2924 Liberty, 99207.

Larry E. Haines
Spokane, WA

- The Mt. Rainier Computer Club meets at 7 p.m. the first and third Thursday of the month. For more information write me at 2450 Lenore Drive N., 98406, or call 752-8735.

Ron Amos
Tacoma, WA

- The Colour Computer User Group in Halifax meets the first Tuesday of every month at the Oxford Community School. Contact me at 6354 London Street, Halifax, or call (902) 455-6341.

Paul A. Power
Nova Scotia, B3I 1X3

- The ESSA Color Computer Club meets at Our Lady of Grace School, Roth Street, Angus every other Monday at 7:30 p.m. For more information please call Eldon Doucet at (705) 424-1354 or me at (705) 728-9481.

A.L. Ley
Barrie, Ontario

- Announcing a new CoCo club: Le Club CoCo La Tuque Inc. Our address is C.P. 458, La Tuque, G9X 3P4. We have approximately 35 members.

Pierre Lortie
La Tuque, Quebec

- I would like to start a club for people using *CoCo Max* or *Graphicom*, so we could exchange ideas and tips. If anyone is interested, please write to me at 258 Delisle, G7G 3B3.

Robert Delisle
Chicoutimi, Nord, Quebec

- The Southern Region Computer Club holds meetings at the Noarlunga Centre every third Tuesday of the month. For additional information contact Darren Ramsey 384-6728, Jan Lindner 382-7600 or me at 381-1036.

Richard Boxall
25 Longview Cres.
O'Halloran Hill
S.A., Australia 5158

- A new CoCo users group has formed in Israel: The First Color Computer Club of Israel. The address is Data Processing Division, 1 Radin Street, Netanya, Israel. We have a vast library of utilities that are at our members' disposal. Meetings are announced in our newsletter. For further information write to me at the above address.

Yosef Krinsky
Netanya, Israel

□

Hint . . .

Unpacking BASIC Programs

If you have come across a program that has had its lines packed so tightly that parts of the lines can't be seen when listed, here is a way to make them visible again in a 64K CoCo. First `RUN` a program, such as this one from Frank Hogg, to put the CoCo in its 64K mode:

```
10 'ROMRAM
20 CLEAR999
30 DATA26,80,190,128,0,183,255,2
22,166,128
40 DATA183,255,223,167,31,140,22
4,0,37,241,57
50 FORI=1TO21:READA:A$=A$+CHR$(A
):NEXTI
60 P=VARPRT(A$)+1
70 POKEP,126
80 EXEC P
90 PRINT"BASIC IS NOW IN RAM"
```

Then simply enter `POKE $HB816,4`. This poke into the BASIC interpreter will allow the full line to be listed. This `POKE` will affect the `LIST`, `LLIST` and ASCII save functions, but will not affect the `EDIT` mode.

Hint . . .

Disabling the Disk Controller

Here's an easy way to modify your disk controller so that you can disable it without unplugging the controller pack. This is useful when you're running programs that won't work on a disk system. The only part needed is an SPST toggle switch, such as Radio Shack's catalog number 275-624.

1. Unplug the controller, open it, remove the circuit board and pull off the metal shield on the bottom.
2. Remove the Disk BASIC ROM (a 24-pin chip), bend up Pin 24 and reinsert the chip.
3. Connect Pin 24 of the ROM to one terminal on the switch. (These wires should be about six to eight inches long.)
4. Turn over the board. Connect the other switch terminal to Pin 24 of the ROM socket.
5. Replace the metal shield, mount the board in the bottom half of the case and replace the top. The wires should come out at the rear.

With this modification in place, flipping the switch on will enable Disk BASIC, while switching it off will disable it. To change from Disk to Extended BASIC, switch it off and press the reset button. To go from Extended to Disk BASIC, type `POKE 113,0` and ENTER, flip the switch on and press the reset button.

Albert Rausch
Ensival, Belgium

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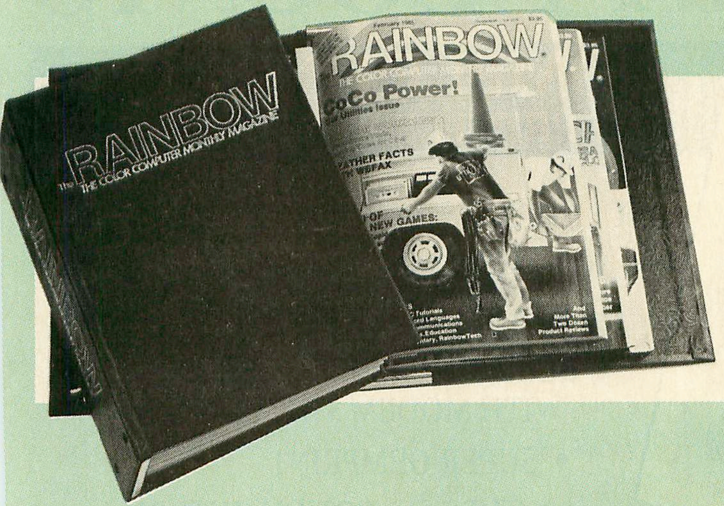

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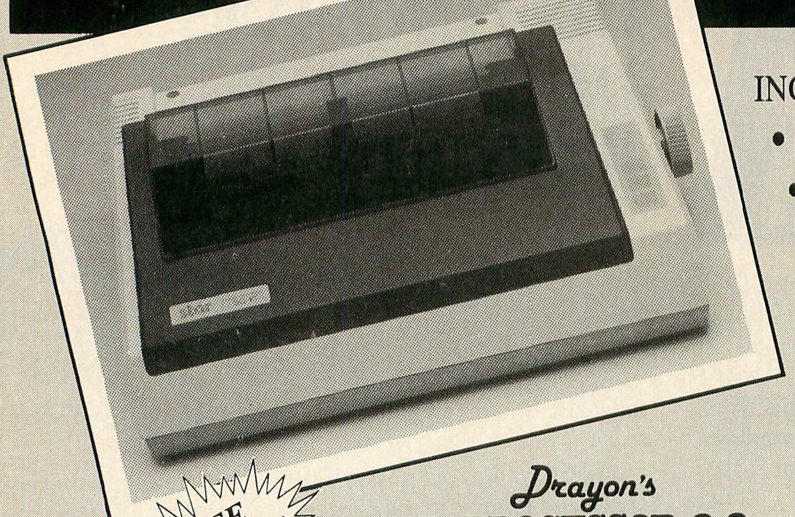

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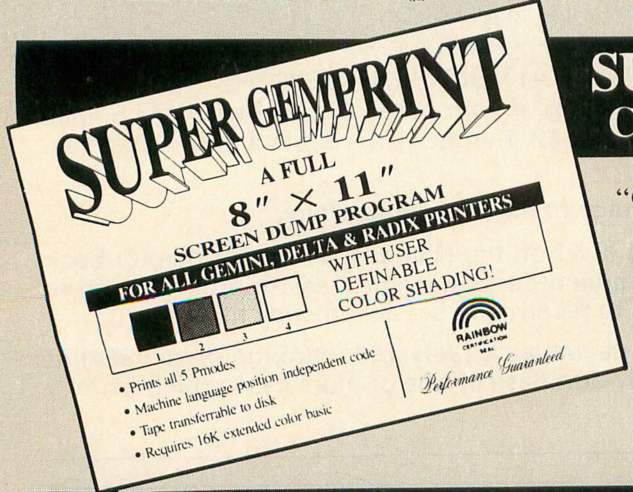

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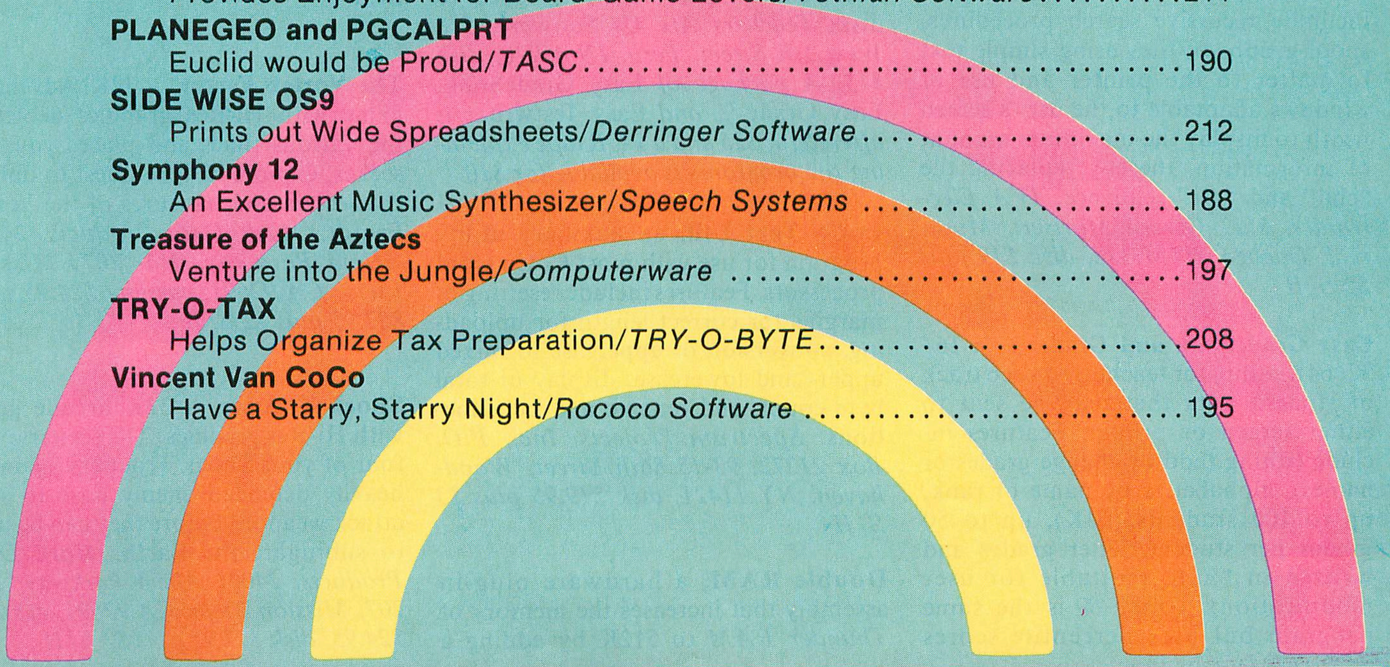


RECEIVED & CERTIFIED

The following products have recently been received by THE RAINBOW, examined by our magazine staff and approved for the *Rainbow Seal of Certification*, your assurance that we have seen the product and have ascertained that it is what it purports to be.

This month the *Seal of Certification* has been issued to:

EZ-Back, a 64K OS-9 utility to back up and restore all or part of a file system, reconstruct all fragmented files back to linearly sectored files to save time on disk reads/writes and repositioning strategically critical sectors, such as directories, to minimize disk head travel. *IVA Electronics, 6117 Gerard Morisett, Montreal, Quebec, H1M 3J8, disk $24 plus $2 S/H*

EZ-Manager, a 64K OS-9 utility to facilitate recursive search procedures, spool groups of files using simple text formatter to the printer and use of windows adaptable to the user's screen width to display the maximum amount of information, thereby replacing the "chd" and "dir" sequence. *IVA Electronics, 6117 Gerard Morisett, Montreal, Quebec, H1M 3J8, disk $19 plus $2 S/H*

Easy Gradebook and Grade %, a 16/32/64K utility for teachers to keep track of student data that may be sent to either screen or printer. Features include editing (add or change grades or names), alphabetize by name or rank, up to 100 students (64K), up to 50 grades per student, letter grades and written in BASIC (suitable for user modification). *Grade %* is the same program but uses percentile scores rather than letter grades. *Teachers Are Us Software, 518 West 5th, Peru, IN 46970, cassette or disk $15*

Easy Testwriter, a 16/32/64K utility on disk for teachers to produce multiple choice or true/false tests. Features include creation of questions, send to screen or printer, answers mixed randomly and up to 100 questions per test. A final exam may be compiled from questions on previous tests saved to disk. *Teachers Are Us Software, 518 West 5th Street, Peru, IN 46970, disk $15. A package of* Easy Gradebook, Easy Grade % *and* Easy Testwriter *is offered for $25 and a VCR tape explaining the programs is available for $10*

CoCo Text Util, an auxiliary utility program for use with most CoCo word processors. Features include resetting of margins for correct length for uploading, conversion of uppercase to mixed upper- and lowercase, display of total byte count, and rename and kill functions. *Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Street, Woodhaven, NY 11421, disk $19.95 plus $3 S/H*

Double RAM, a hardware plug-in assembly that increases the memory of *Thunder RAM* to 512K by adding a second bank of memory chips, a control module and a switch for bank selection. The unselected bank is placed in a standby state without losing its data. *Thunder RAM* must be installed and working properly and it is necessary to remove one wire from the *Thunder RAM* assembly and solder another to the circuit board. *Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Street, Woodhaven, NY 11214, $79.95 plus $3 S/H*

The Vortex Factor, a 32K Adventure game with Hi-Res graphics depicting the various times and places you, the seeker, explore in your quest to unlock the secrets and treasures of the Vortex Factor. *Mark Data Products, 24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691, cassette $24.95, disk $27.95 plus $2 S/H*

Shock Trooper, a 32K arcade game with Hi-Res graphics. The scenario pits four of your Shock Troopers against a heavily defended enemy base to steal attack weapons before they can be used to subjugate the Earth. *Mark Data Products, 24001 Alicia Parkway, No. 207, Mission Viejo, CA 92691, cassette $24.95, disk $27.95 plus $2 S/H*

Infomania: The Guide to Essential Electronic Services, a 314-page soft-bound book to inform novices and veterans of the myriad collection of electronic services, tips on what hardware/software is likely to meet a user's needs, what the electronic services offer and their costs to consumers, and evaluations of over 250 electronic services available today. *Houghton Mifflin Company, 2 Park Street, Boston, MA 02108, $14.95*

Assembly Language Programming for the TRS-80 Color Computer, a 289-page soft-bound book that shows in a tutorial fashion how to program in assembly language. Hardware functions, capabilities of the CoCo and how to control them with assembly language are explained, and there is a chapter on how to use all *EDTASM+* capabilities. *TEPCO, 30 Water Street, Portsmith, RI 02871, $16 plus $1.50 S/H*

OS9 Utilities Package, a 64K OS-9 set of utilities with transfer routines for moving text between Disk BASIC and OS-9. Included among the commands are: GREP, a pattern search utility; CRYPT, a file encryption/decryption utility; and CALC, a scientific floating-point calculator that evaluates arithmetic expressions. *The Other Guy's Software, P.O. Box H, Logan, UT 84321, disk $19.95 plus $2 S/H*

Homeware, a 16K home utility package consisting of six modules. A Calendar module creates calendars on screen or paper and adds notes to specific dates on a large format calendar. A Savings module calculates compound interest including principal, time (years), yearly rate of interest, future principal and interest earned. A Loan module calculates time (years) to pay back, amount of payment, balloon payment and total amount repaid. A Directory module tracks telephone numbers, addresses, birthdays, other information and prints out address labels of up to four lines. An Inventory module tracks household possessions for insurance purposes, hobby items and/or the inventory of a small business. A Home-Writer module is a word processor suitable for use in common household tasks such as making lists, recipes, memos and writing letters. *Tothian Software, P.O. Box 663, Rimersburg, PA 16248, entire set on cassette $49.95, individual modules on cassette $19.95,* Saving and Loan *sold as one module.*

Computer Underground, a 257-page soft-bound book by M. Harry on computer hacking, crashing, pirating and phreaking. Discussed are terminology and security measures for protecting computer systems and data. *Loompanics Unlimited, P.O. Box 1197, Port Townsend, WA 98368, $14.95*

Telewriter-64 Character Set Editor, a 32K ECB screen utility that allows the creation of modified character sets used by *Telewriter-64* to suit user preference. Possible are true descenders, special characters and foreign language character sets. *CMD Micro Computer Services Ltd., 10447 124th Street, Edmonton, Alberta, Canada T5N 1R7, cassette $14.95 plus $2 S/H*

Starship Simulator, a 64K strategy game that places you in the role of starship captain fighting the Mions. Your weapons include phasers, photon torpedos, a cloaking device, warp speed, plasm bolts and a self-destruct mechanism, but every tactic deployed costs your finite energy supply. *RDB Software, 379 Goodwin Rd., Eliot, ME 03903, cassette $21.95, disk $26.95*

Comm-4, a hardware/software serial communications interface package requiring an expansion device such as Multi-Pak or CC Bus. Users are allowed serial I/O capabilities utilizing four RS-232 channels. Supported are full modem control and the enhancement of multitasking and multi-user features of OS-9. *CoCo Devices, P.O. Box 677, Seabrook, TX 77586, $108*

The *Seal of Certification* program is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the product does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW's reviewers for evaluation.

— Monica Dorth

REVIEWING REVIEWS

EDOS2.6

Editor:

In the December 1985 issue of THE RAINBOW, *EDOS2.6* was reviewed [Page 235]. Many thanks. I must point out that the price reflected is incorrect. *EDOS2.6* sells for $39.95 U.S. and $49.95 CDN. Also, a new version, *EDOS2.7*, is available and includes two new commands as well as a new prompt giving the default drive number.

EDOS can be customized at no charge at the time of ordering from Micro Computer Services, and a 16K version of *EDOS* is currently being developed. It is intended for use in the new controllers that will accept 16K EPROMs. Expected release date is the summer of 1986.

Eldon Doucet
Angus, Ontario

TX

Editor:

I would like to respond to the review of *TX* by John Ogasapian [March 1986, Page 209]. Few people need or use in their personal correspondence underline, subscript, superscript, double-width print, etc. Few people write professionally at home with a CoCo.

TX is intended for those users who just want to compose a simple letter or form on an 80-column by 66-line printer page. *TX* does this easily, at a cost of $12.95. Certainly, heavyweight WPs give embeddable printer codes and a 10-page buffer, but in reality, how many people write a 10-page letter to grandma with italics, subscripts, etc.?

TX displays the page exactly as it will appear on the printer. To accomplish this on a standard CoCo screen, *TX* uses the screen as a window over the printer page, and the four arrow keys guide the screen and cursor around the page with the cursor being non-destructive. From the main menu, pressing ENTER moves to the page editor and change is the default mode of *TX*. While entering text, users can access the 16 function keys (that include center, string$, calculator, mark, erase and print block) by holding SHIFT and pressing ENTER.

The program is in BASIC and the editor is admittedly slow, however the maximum typing speed has been changed from three characters per second to eight cps. *TX* holds one page at a time. When more are needed, users can store them, one at a time, on a diskette using disk I/O from the main menu. Printer control codes cannot be embedded within the text.

If you need printer codes, or can't tolerate typing at eight cps, then *TX* isn't for you. But if you're looking for something with a simple format (what and where you type is what you get), *TX* is an inexpensive answer.

Fred Kolesar
Kolesar B/S

Microartist

Editor:

I would like to thank John W. Robinson for the fine review of *Microartist* that appeared in the December 1985 issue of RAINBOW [Page 240]. We appreciate both his compliments and comments, which prompted the author, Woody Pope, to make several improvements to the program. A multiple GET/PUT function is now available and the spray paint function has been enlarged. An UNDO function has been added to allow the user to correct mistakes before they become a permanent part of the picture. *Microartist* owners who would like to update their version to version 2.1 may do so by sending their original tape or disk and $6.50 ($5 plus $1.50 S/H) to Prickly-Pear Software.

Joanne Chintis
Prickly-Pear Software

Calculating Parts Per Million

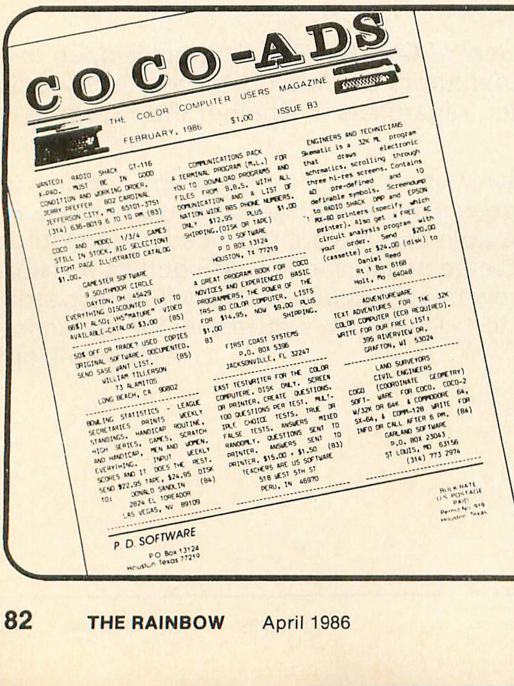
Editor:

I would like to thank Mr. Odlin for his review of my program, *Calculating Parts Per Million*, March 1986, Page 195. I made *PPM* user friendly and added a routine to give the amount in tablespoons so that home gardeners could use it.

Mr. Odlin has made some suggestions concerning the program flow and screen display. I have taken his suggestions to heart and revised the program. Now the error-trapping routines work better and the screen display looks better. I have also expanded the documentation to four pages so that it will be more easily understood, especially by home gardeners.

Jose Garcia
Green Horizons

We welcome letters to "Reviewing Reviews" and remind you that they may also be sent to us through the MAIL section of our new Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.



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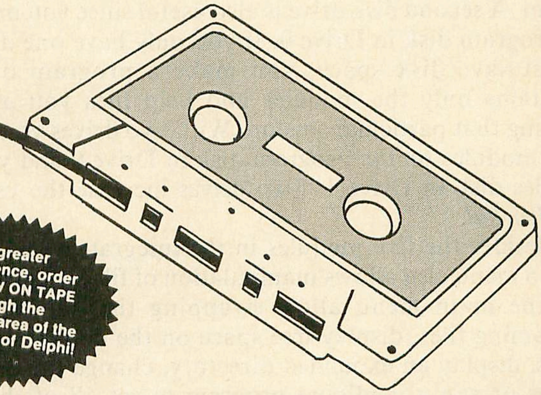

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April 1985 (Hardware/Simulation issue) — *CoCo Payroll*, part two of a complete small business payroll; *Landlord's Helper*, part two of a program that manages rental property; *Surface*, a Simulation that takes you to the North Pole; *Cardio*, a Simulation that transfroms you into a heart specialist; *The Adventure Writer's Toolkit*, offers tips on writing your own Adventure; *Run for Your Life*, a survival game; *Concert*, a animated graphics program; *Porsche*, a graphics representation of the Porsche 930 Turbo; and *Wishing Well*, a collection of educationa programs that help make learning more fun; plus four additional programs.

April 1984 (Gaming issue) — *Roulette*, a betting game played on the numbered wheel; *The Icing on the Cake*, a tutorial on writing Adventure programs; *Craps*, a game played at the "Casino CoCo"; *A Day at the Races*, a BASIC game that simulates horse racing; *Bingo*, a game where your luck is in the cards; *Blackjak*, a game for the "21 and under" crowd; *Memscan*, a utility for the memory explorer; *The Home Slot Machine*, a real money saver for the BASIC gambler; *Spinning Fortune's Wheel*, a rotary "hangman" game for up to eight players; *Place Your Bet*, a pari-mutuel wagering system for your Derby party; plus seven additional programs.

PenPal is Useful and Affordable

PenPal is an integrated software package that includes a word processor, a spreadsheet, database, communications package and a graphics package. Users have options to print out data from the spreadsheet and produce pie graphs, horizontal or vertical lines, dot or bar graphs. Files can be transferred between modules, saved to disk, sent to a printer or transmitted over a modem. All these functions can be accomplished without leaving the integrated program.

Each program module has its own online help screen at the bottom of the screen. The keys '1' through '9', '0', ':' and '-' in conjunction with the CLEAR key and the SHIFT-CLEAR keys act as functions 1 through 12 and alternates 1 through 12 respectively.

PenPal requires 64K and at least one disk drive. While a graphics printer and a modem are considered optional, there are many features you will not be able to use without them. A second disk drive is also useful since you must have a program disk in Drive 0. If you only have one drive and must save disk space, you make a program disk that contains only the modules and help files you are using during that particular session. With two drives you have all the modules on the program disk in Drive 0 and you have a files disk in Drive 1. Two drives increase the versatility of *PenPal.*

Besides the five modules in the integrated package, the main menu also allows manipulation of files. Function keys in the main menu allow swapping the default drives, renaming files, display free space on the default drive, kill files, display an expanded directory, change the drive step rates or run a configure program to set all of the above defaults. Along with these seven functions, *PenPal* has four alternate functions that are available at any time from any of the modules and main menu. A simple calculator is available, the option to set up the printer defaults, toggle between white and green screen display modes or a help file can be called up for the specific module currently engaged.

Now, the individual programs do not always have all the bells and whistles some of the larger, more expensive programs have, but in a few cases *PenPal* has more bells but less whistles. For example, the Write module is slightly restricting in that you definitely do not get what you see, i.e., the way the text looks on the screen is not necessarily how the printout looks. In my opinion, this is the chief weakness of the program. I would like to see a 64-column mode. The screen is Hi-Res consisting of 50 columns. While the Write module does not have all the options some bigger programs have, it does have 18 functions, making the first nine function keys used twice. These functions include Find and Replace, an overstrike or insert mode, delete character and line functions and the ability to merge files to the end of the current file. Also available are multiple block functions.

The Calc module includes most of the more popular functions. The spreadsheet is laid out into 255 columns and 255 rows. Of course, you cannot have a 255 column by 255 row spreadsheet but this layout does allow the user good flexibility. The Database module includes many options of the more popular databases. While no database is going to cover everyone's needs, *PenPal's* version should cover most requirements.

The Graph-It module is very useful for creating graphs from the data of the Calc portion of *PenPal.* Users are given seven options of the type of graph to plot. As mentioned earlier, possible selections are a pie graph, horizontal or vertical line dot or bar graphs. Users can then add more than five styles of text as labels, print the graphs out using standard or double-width modes, or save the graph in a binary format and later modify it with any of the several commercially available graphics programs. *PenPal* comes with six printer drivers: Epson, Gemini, CGP-220, the DMP series, LP VII and VIII, and C. Itoh 8510A. This module has many options and a review could be written on just this module alone. It is the most powerful module of *PenPal.*

The Telecom module is the last of the *PenPal* modules and is also well-designed. When at the main menu, users can choose any of the auto-log files they have created for any BBSs wanted or they can create a new auto-log file to get on a new BBS in the area. Once in Telecom, users have all the options of most terminal packages and maybe even some added features.

For instance, you can use the auto-log file you called up or you can go straight to the terminal mode. For transferring data you have three protocols from which to choose. You can use the simple mode that has no built-in checks or you can use the very popular XMODEM protocol. You also have a third choice, *PenPal's* own protocol that uses a checksum to ensure error-free transmission. This last option can only be used if the other party also uses *PenPal.*

The more I used *PenPal* the more impressed I became. It is nice to be able to switch between the modules quickly and have all the data from the different modules compatible with each other. There are other packages available that do this, but they are not as affordable as *PenPal.* It may be true that if taken separately, any one of the modules is not outstanding, but together, *PenPal* makes a very useful package. The weakest part of *PenPal* is the 50-column screen on the Write module, but I believe the power in the Graph-It module compensates for this weakness.

The documentation is well-written and is very easy to follow. Four Star Software seems to have done it again, and I readily recommend *PenPal.*

(Four Star Software, P.O. Box 730, Streetsville, Ontario, Canada, L5M 2C2, 64K disk $89.95 U.S., $119.95 CDN)

— Dale Shell

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CAIS Ends Chaos in Your Checking Accounts

CAIS stands for Checking Account Information System, a disk-based program that requires at least 32K and a disk drive. It handles multiple drives for data disks and sends to any 80-column printer, but does not require one. It is written in BASIC in seven disk modules, which are accessed during the running of the program. It also POKEs machine language routines that disable the BREAK key and enable virtually error-free screen input of data.

CAIS records checking account transactions, including Automatic Teller Machine (ATM) transactions, interest and service charges, and other debits and credits into disk files that maintain a record of that account. The program then functions to reconcile your checking account when you receive your statement, maintaining a history of both reconciled and outstanding debits and credits. The program is capable of maintaining records on eight accounts using the same program disk, although additional data disks in additional drives are necessary for more than two at once. Each data disk is capable of holding three accounts.

It also prints reconciliation summaries and account summaries. Although no accommodations are made within *CAIS* for advanced printer capabilities, they could easily be added by altering the BASIC program.

Program functions are accessed through menus. The first order of business is to set up the accounts by name of bank, account number, whether it is an interest bearing account or not, and the drive number on which the data will be found. That account is then created on the disk. You may then post transactions, which include the listing of checks, deposits, ATMs, interest, service charges and miscellaneous debits or credits.

When the bank statement arrives from the bank, you select the "reconcile account" option, which steps you through all your recorded transactions as you indicate, one by one, whether those transactions have been cleared or not. You are also prompted to indicate service charges and interest earned. When you are finished, *CAIS* creates a file of cleared transactions called a "history file" and maintains outstanding checks, etc., in an active file. This module offers the option of getting a printout of the reconciled and outstanding checks, as well as current summaries of your checking account. Naturally, the program maintains the current balance in your accounts at all times.

Selecting the "display accounts" option offers the choice of seeing your current balance, reviewing your current transactions, searching for specific checks and getting a complete summary of any account. It is this module that offers editing capabilities for all transactions that have not yet been reconciled. Although you might expect to be able to get a printout of the account summary option, it is not possible from this menu.

The last main menu is that offering the "file management" options. From this menu you can change or delete whole accounts or purge an account history. The latter is an option meant to clear the transactions from an account at the end of a quarter or a year. When an account history is purged, the option to print out all transactions of the purged period of time is offered. In a typical scenario, this printout would be a valuable reference to search for tax-deductible expenses at that time of the year. The purge also empties the data from the account disk file giving you a clean slate of disk space on which to start a new year.

A final option is to get a display of the disk utilization, which keeps you posted on the available disk space for any account. Three files are created for each account, one for credits, one for debits and one that holds cleared transactions. The number of disk granules used for each file, as well as the percent of disk space available, is given.

I was especially impressed by two aspects of *CAIS*: the documentation and the screen input. The documentation is 43 8½ by 11-inch pages in a soft vinyl folder, produced by a dot-matrix printer. But what impressed me is its organization, clarity and lack of errors. Each menu is reproduced in the documentation, each option is explained whenever it is available, and proper use of indentation and boldface type make its use as both a tutorial and a reference possible. The last page is a form soliciting user comments.

The screen input, accomplished by poking a machine language routine into memory, makes entry easy. I will use the entry of checks as an example. The data lines are check number, date, amount and payee. Data is entered into a blue field with arrow keys controlling the cursor. The check number is automatically updated after each check, but may be changed by typing the new number. The cursor moves to the next line when the field is full. The date must be entered by MM/DD/YY (Month, Day, Year — two digits each), but only changed data need be entered; other numbers stay as they were. The amount is registered as dollars until the user presses the decimal (period). It is not necessary to enter the decimal or zeros if there are no cents. The payee line is 30 spaces long. Since the search-for-checks function selects from any part of the string, you could use the ample field to describe checks by categories in addition to payee.

The unfortunate part of *CAIS* is that one of the really useful parts of a program for recording all your checks is missing. After creating diskfuls of files with my year's checks, I would expect to be able to pull out expenses by categories that may be tax-deductible, get the total and a printout. Organization by category would also be useful for setting up budgets. The rather limited printout options are also a drawback. I would like to be able to change the printer Baud rate within the program. It would also be useful to get printed reports of checks from one date to another and reports showing all checks to specific payees.

If you have more than one checking account, even up to eight, the program helps you track and update them all easily. I would like to see the implementation of my suggestions because the quality of *CAIS* leads me to expect good things from possible upgrades. Overall, however, *CAIS* is a good applications program that delivers a quality job for the dollar.

(After Five Software, 8100 Bayfield Rd., Apt. 8-0, Columbia, SC 29223, $24.95 plus $2.50 S/H)

— Dennis A. Church

Files
View
Disk
?
Data Directory
File1
Datafile
Budget
April85
Friends
Bulletin
Kidstuff
Resumes
Year1985
Compusrv
DowJones
Picture1
May85
Recipes
Entrpriz
1
2
3

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LEDGER

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INDEX CARDS

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TELECOM, a communications program lets you access national information services, plus transmit and receive files from other computers by phone (requires modem).

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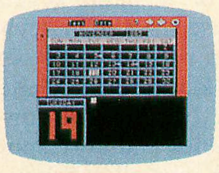
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Symphony 12 is an Excellent Music Synthesizer

Symphony 12 is another release from Speech Systems and is one of a long line of excellent products developed by them for the Color Computer. *Symphony 12* is a 12-voice hardware music synthesizer. It comes in a ROM pack along with tape/disk software that contains the necessary programs to operate the synthesizer and some sample music files for listening. This creation is a marvel for a machine that is supposed to have one operational voice. Some software developers have created programs with BASIC and machine language to create up to four voices, but this from Speech Systems emulates 12 separate voices. It features four noise channels and plays in stereo or mono. It can be hooked up to your home stereo or jam box. Special sound effects can be created and *Symphony 12* is compatible with *Musica* files (Version 2.7).

Symphony 12 alone comes with a program disk or tape and the ROM Stereo Pack. The options available include: Piano Keyboard (2½ octaves) for $79.95, Piano Keyboard (4 octaves) for $119.95 and Y-Cable (required for disk) for $28.95.

I used a Mutli-Pak Interface to connect the hardware cartridge and disk controller to my computer. I put the disk controller in Slot 4 and the sound cartridge in Slot 3. The sound cartridge has two RCA-type jacks that can connect to your stereo system. If you want to connect the stereo cartridge to your computer monitor, you need a Y-adapter cable so you can hear both output channels. *Symphony 12* comes with a stereo patch cord to connect the stereo cartridge to your stereo or computer monitor.

I didn't have one of the piano keyboards for this review, therefore I had to use the CoCo keyboard. *Symphony 12* uses the bottom two rows of keys as the piano keyboard. The 'Z' through '/' keys are the white notes (A, B, C, D, E, F, G, A, B and C). The second row of keys, 'S' through 'L', are the black notes and correspond to B flat, D flat, etc. The CoCo keyboard allows you to play around with the various voices of *Symphony 12*. However, it is very limiting and difficult to play anything halfway serious. Octaves can be raised and lowered, but must be done manually by pressing the SHIFT key and one of the up- or down-arrow keys. You are given a visual piano keyboard on the computer screen and indicators are given as each note or chord is played. For serious users, Speech Systems and I both recommend one of their piano keyboards.

If you are already a *Musica* owner, you may use your *Musica* creations with *Symphony 12*. However, only four voices are available to you. To take advantage of the 12 simultaneous voices, you must create the music with *Symphony 12*.

Symphony 12 gives you control of many aspects of generating various sounds. You have control of volume, the envelope (sound shape), noise, rhythm and preset instrument settings. The program comes with nine preset settings, each of which can be changed or adjusted to fit your particular needs. This allows the user to quickly change from one voice setting to another. Once you set up voicing to your liking, you can save the settings to tape or disk for future use.

The music you create with *Symphony 12* can be recorded in real time, or saved to disk or tape for future playback. When you press the 'R' key, everything you play is remembered by the computer and replayed at your command. The manual does not indicate how much the program can remember, but this is an excellent feature. If you make a mistake, you must start over again with the recording and the previous one is erased. A special feature of playing music is when you press a note to sound, you can "bend" the sound up or down. By pressing the CLEAR key you raise the pitch, and the SHIFT-CLEAR to lower the pitch. I found this feature absolutely fascinating!

Envelope and noise control are somewhat complicated, but the manual gives very simple information to control these features. The manual also gives technical specifications for the A4-3-8912 chip that is the heart of the *Symphony 12* program. This would be useful to serious programmers and technical users. Noise can be used to accompany the sound so that it takes on a breathy quality, but noise and rhythm cannot be on at the same time.

When playing musical files, you are asked if they are in the *Musica* format or the *Symphony 12* format. You can play a *Musica* file in the *Symphony 12* format, but remember, you can only use four voices. One nice feature this method allows is to change instrument settings as the music is played. This is particularly fun and enjoyable. You can also play each of the four voices as separate instruments.

Symphony 12 has a demo program that shows how to create various sound effects. You hear a wolf whistle, race car, Pacman laser, bomb, steam locomotive, and a little Bach, among others. *Symphony 12* files can be accessed from BASIC and the manual gives those instructions and a sample printed program.

This program would be a great addition to any music lover or user's library. *Symphony 12* does not support printer operations, therefore files must be recorded in the *Musica* format and transferred to the *Musica* program for printing. Speech Systems has quite a library of *Musica* files for your enjoyment and they are quite inexpensive. There is also a National *Musica* Users Group that supports this program.

You can gather that I enjoyed *Symphony 12*. My only dream is to have a program that allows you to play a note on a keyboard (piano or computer), display the note on a musical staff, sound the note or chord and send it to a printer. Maybe that will be next from Speech Systems.

(Speech Systems, 38W255 Deerpath Road, Batavia, IL 60510, $79.95)

— James Ray

See You at
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CoCo Max II Features Major Enhancements

CoCo Max II is an enhanced version of the original *CoCo Max* graphics system that was reviewed in the June 1985 issue of THE RAINBOW (Page 217). The materials I received for this review were for the upgrade to *CoCo Max II* from the original version of *CoCo Max*. If you're not familiar with *CoCo Max*, please refer to the previous review; I'll be highlighting the enhancements to *CoCo Max* that upgrade it to *CoCo Max II*.

CoCo Max II is available to *disk users* only for $79.95 plus $3 shipping and handling. The original *CoCo Max* was discontinued after January 1986. *CoCo Max* owners may upgrade to *CoCo Max II* for a fee of $20 plus $3 to cover shipping and handling.

The *CoCo Max II* upgrade comes with a non-copy-protected diskette and a 16-page User's Manual Addendum. The diskette contains the *CoCo Max* system, one picture (not much room on the disk for more), a second pattern set, and a BASIC program to configure the system for multiple drives, various printer models and Baud rates.

My diskette contained machine language drivers for C-Itoh, DMP-100, DMP-105, DMP-110, DMP-120, DMP-200, DMP-400, Epson MX, Epson RX, Gemini, Gemini X, LP VIII, Oki 82, Oki 92 and TRP-100 printers.

The User's Manual Addendum is comprehensive, illustrated and well-organized like the original *CoCo Max* User's Manual, and its packaging matches the original.

New Features

Multiple drives are now supported; the *CONFIG* program supplied enables you to configure *CoCo Max II* for the number of drives in your system. "Clicking" the Drive option in the Files menu changes the working drive number.

CoCo Max II has error reporting, a deficiency of the original. *CoCo Max II* informs you if the disk is full, or if you try to load a non-existent file.

Files may now be loaded by "clicking" on the directory listing in addition to manual entry from the keyboard.

A Clipbook file has been added to save any Clipboard file to disk under the filename *CLIPBKXX/SYS* (where the "XX" is any two-digit number) for later retrieval. The maximum number of Clipbook files you can get on one disk is 68; they're saved in standard machine language format.

The patterns created with the Edit Pattern function can now be saved to disk. The Files menu includes a Save Pattern function to save the current pattern set in a file called *PATTERN3/MAX*. You have no control over the filename the pattern set is saved under. If you want to make another pattern set to save, you must quit *CoCo Max II*, rename the *PATTERN3/MAX* file and re-enter *CoCo Max II*. The next Save Pattern saves the pattern set as *PATTERN3/MAX*. The procedure to load a pattern set is the same as that for loading a picture: the file's address information causes it to load into *CoCo Max II*'s pattern tables rather than the picture area.

Hint . . .

Command Disable

To disable the `LIST` and `DIR` commands on your computer, use `POKE 158`. This simple `POKE` can be undone by entering `POKE 383,126`.

Fourteen different character fonts are now supplied including the new Glyphic font. Some of these are size variations of one font (small, medium, large), but overall a good selection to fit many applications. The Glyphic font associates a small drawing to a key (similar to sprites on other computers), for instance, the 'a' key causes the "pencil" icon in the tool kit to be drawn, the 'b' key, a pair of eyeglasses, and so on. Youngsters will certainly be fascinated with this font, which allows them to make rubber stamp-like drawings by using the keyboard.

Edit Pattern has a new feature that enables you to pick up a pattern from a picture by "dragging" the mouse over the picture area; releasing the button captures the pattern.

A Window Locator has been added to the Show Page function that lets you select your working area from the entire picture in the Show Page display.

A Rotate function has been added to the Edit menu. Parts selected by the Edit Box may be rotated 90 degrees clockwise about the center of the box.

A dynamic two-dimensional Stretch feature has been added that lets you stretch or shrink part of the picture selected by the Edit Box. By holding down the space bar and dragging the mouse in the windowed portion of the picture, the window stretches or shrinks in the direction the mouse moves.

Deficiencies

CoCo Max II deficiencies are minor and few. Lack of access to file functions such as Kill and Rename are not serious, just slightly bothersome. *CoCo Max* has no provision for killing or renaming files.

The inability to handle filenames in Disk BASIC syntax is annoying. I succeeded in saving a file called *1:JUNK* on Drive 0; Disk BASIC would have recognized that I wanted the file *JUNK* on Drive 1, but *CoCo Max* thought the "1:" was part of the name.

Though not deficiencies, here are a few things I'd like to see added to *CoCo Max II*: a programmable grid, such as one for printed circuit board layouts; a programmable zoom magnification; and rotation for increments smaller than 90 degrees.

Conclusions

CoCo Max II offers a major improvement over the original *CoCo Max* in respect to file handling and error reporting. The enhancements of multiple drive support, window stretching and clipbook files provide a new level of performance to an excellent graphics system.

(Colorware, Inc., 78-03F Jamaica Avenue, Woodhaven, NY 11421, 64K disk, Y-cable or multi pack Interface, joystick, mouse or touch pad required, *CoCo Max II* disk $79.95 plus $3 S/H, *CoCo Max II* upgrade disk $20 plus $3 S/H)

— Jesse W. Jackson

Euclid would be Proud of *PLANEGEO* and *PGCALPRT*

By John McCormick

PLANEGEO and *PGCALPRT* both do practically the same thing: they calculate the various parts of most plane geometric figures (square, circle, polygon, rectangle, parallelogram, trapezoid, right triangle, oblique triangle and ellipse) from the various combinations of data you have available (diagonal, side, area, etc.). These programs are aimed at engineers and others who have a regular need for these calculations.

You might ask just why an engineer would need to have a program to tell him the area of a square is found by squaring one side. Well, if you do, please tell me (off the top of your head) what is the area of a circle having a chord length of 100 feet and a chord height of 10 feet? According to *PLANEGEO* the area is 53,092.917 square feet.

Both *PLANEGEO* and *PGCALPRT* are written entirely in BASIC "to permit the user to make changes" (a comment in the documentation I found prophetic).

The lack of machine language is no handicap since the actual calculations performed in the program are quite short and BASIC doesn't really slow down the operation at all.

A nice touch is the Conversions program, which converts various data, such as feet, inches and fractions to feet and decimals, or the reverse, to the nearest $^1/_{16}$ inch and also converts angles in various ways.

PLANEGEO

This program comes on a double-sided disk (which must be turned over for some calculations) and has a smaller user's manual because almost anything you want to know about these geometrical figures is included in the program itself.

Talk about user friendly! There are over 100 menus in this program (if I didn't lose count) and you can even call up an illustration of a square and be shown graphically what a side looks like. The menus also offer a complete listing of the formulas used in all calculations and word descriptions of the process.

These extensive help menus don't slow down the program (other than the fact that the extensive on-screen documentation requires the two-sided disk) because they only appear if you request to see them. Even this is not much of a problem since all calculations for a given shape are done with no disk changes.

What *PLANEGEO* doesn't have is a way to print out the results, which brings us to:

PGCALPRT

This version does exactly the same calculations as the other but, because of the reduced on-screen documentation (the user's manual is over twice as big as *PLANEGEO*'s), the entire program fits on one side of a disk, thus eliminating some delays.

PGCALPRT prints out results. Unfortunately, in my opinion, it always prints out results. In fact, it won't even run without a printer online. This feature can lead to lots of wasted paper.

BUGS

I wish I didn't need to have this section but, alas, these very user-friendly programs do contain some bugs.

In *PGCALPRT*, for instance, if you try to exit the conversions portion of the program you find that the authors accidentally used the conversions subprogram from *PLANEGEO* and it therefore calls the wrong program (NE Error in Line 610). Anyone with experience in BASIC can easily repair this bug (change `RUN″PLANGE2″` to read `RUN″PGCALPRT″`). This repair allows the program to operate but still leaves a problem. The version mistakenly used in *PGCALPRT* does not print out results. This means that after running a conversion you must copy down the results before returning to your calculations. TASC acknowledges the problem and I feel certain they will have it corrected.

Another problem cropped up in *PLANEGEO* when trying to use "Parts of a Circle." Line 1800 contains a reversed ')' (close parenthesis mark) after `POKE`. The program ran fine when I changed this to '(' (open parenthesis mark).

Room for Improvement

The first point is a matter of judgment. The program contains no provision to prevent erroneous input data (for instance, you can calculate the area of a one-sided polygon). One of the authors, a chemical/mechanical engineer, told me that since the program is aimed at professionals he felt (subject to user complaints) that this modification is not needed.

Personally, I feel such a user-friendly program cried out for this further enhancement to prevent accidental input

About The One-Liner Contest . . .

THE RAINBOW's One-Liner Contest has now been expanded to include programs of either one or two lines. This means a new dimension and new opportunity for those who have "really neat" programs that simply just won't fit in one line.

Here are the guidelines: The program must work in Extended BASIC, have only one or two line numbers and be entirely self-contained — no loading other programs, no calling ROM routines, no poked-in machine language code. The program has to run when typed in directly (since that's how our readers will use it). Make sure your line, or lines, aren't packed so tightly that the program won't list completely. Finally, any instructions needed should be *very* short.

Send your entry (preferably on cassette) to:

THE RAINBOW One-Liner Contest
P.O. Box 385
Prospect, KY 40059

but, on the other hand, since the program only performs very limited calculations, there is very little chance that an erroneous input would lead to further trouble.

Now we come to what I consider a serious mistake. I did not like the fact that *PGCALPRT* did not allow me the option of printing or not printing my results; I think that changing this would be a great improvement in the usefulness of the program.

It may be nit-picking, but the fact is that neither program addresses the problem of the trapezium (for those who need a refresher, a trapezium has four sides with no two parallel). The user's manual points out . . . "It is a very common figure. Most real property is of this shape . . ." and recommends that a trapezium be broken down to two triangles and solved that way. This is certainly the way to approach a trapezium, but I feel a program that offers to define the area of a square should have presented more information about this "very common figure."

I know it is easy for a reviewer to make suggestions since he didn't sweat over the original product, but I have a few anyway.

The authors consistently point out that the program is designed for professionals, yet they include even the most elementary of explanations. This is not a fault, it is a virtue. I feel that if *PLANEGEO* had a bit more information added it would make a fine educational tool; it is almost ready to give to a high school student in its present form, and certainly with a little added information (perhaps just a new user's manual) it would be a better educational program than many I have seen.

My other suggestion is to make printing optional for *PGCALPRT* instead of mandatory. In my opinion, this would make it a better product for professionals.

Conclusion

Apart from some minor bugs, these are good programs — very user friendly. In my college days we carried slide rules and CRC books at all times and dreamed of programs like these.

(TASC, 10619 Bayou Glen, Houston, TX 77042, 32K ECB and disk drive required, *PLANEGEO* disk $25, *PGCALPRT* disk $25, or both $40)

See You at
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May 23-25

CoCo Keyboard Software Increases Function Key Duties

If you are among the people who have switched your original CoCo keyboard to one of the popular replacements, here is a short program you may be interested in.

The *CoCo Keyboard Software* works on a 16/32/64K CoCo with Disk Extended BASIC. To start the program type `RUN"BOOT"` and press ENTER. A title screen appears and allows you to specify how much memory your computer has. A short machine language program is loaded and auto-executes, resulting in these function key uses:

HJL-57 and Micronix keyboards:
F1=Text screen dump
F2=Tap & release-9600 Baud printer
F3 + SHIFT=BASIC LIST
SHIFT + F4=Cold Start
A Deluxe keyboard has these function key uses:
ALT=Text screen dump
CTRL=9600 Baud printer
F1 + SHIFT=BASIC LIST
SHIFT + F2=Cold Start

My CoCo has the HJL-57 Keyboard and *CoCo Keyboard Software* worked fine, although I did notice one bug. After hitting F1 for the text screen dump, the '@' symbol returns following the cursor. All the other functions worked fine.

Although the HJL-57 Keyboard comes with a listing to program the function keys, the keys do things other than the screen dump, namely key repeat, upper-/lowercase toggle and a control key. *CoCo Keyboard Software* then provides the user with three additional often-used functions and is inexpensive.

The disk is not copy protected, so backup copies for your own use is not a problem.

The documentation consists of a half page instruction sheet and is adequate for a short program of this nature.

If you use the function keys on your replacement keyboard and/or would like to increase their duties, *CoCo Keyboard Software* can fit your needs.

(Spectrum Projects Inc. P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY 11421 $14.95 plus S/H)

— David Gerald

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Conquering Armies is a Challenging Simulation

Conquering Armies is a satisfyingly difficult game to play. There are 50 levels of difficulty. Level 50 must be a real killer, because the highest I was able to go was level seven. The game is played on a map of the mythical kingdom of Glasco. You are the heir to the throne, and six of seven of your provinces have been taken over by enemy forces. Your task is to recapture your lands. (No matter at which level you play, this scenario stays the same, i.e., the same six provinces are always under enemy control and you are always in control of Avon.)

Depending on the level of play selected, the number of troops you control will differ. They are divided into the categories of knights, light cavalry, men-at-arms and archers. Typing 'I' at any point gives an inventory of the areas and troops you control and gives the option of creating an army with some or all of those troops. You also have one, two or three allies that can help by giving extra troops if you can get one of your armies to their castles — not always an easy task. The number of allies varies with the playing level and random chance. Each time you recapture one of your lands, you also gain troops. The liberated inhabitants also enlist with you, showing their gratitude by their willingness to be slaughtered in your next battle.

The playing screen is a nicely done map. The small red castles represent castles that rule the country of their location. The large red castles are capital cities. Red lines mark off countries, with yellow areas controlled by you and green areas controlled by the enemy. A blinking green dot indicates an enemy army on the move. Since enemy territories are green, their armies are invisible until they cross your borders. They will occasionally flash, giving you the equivalent of a "rumor" of their approach, a nice touch. Your armies (you can have up to five armies active at any one time depending on the troops you control) also show as a blinking dot, visible at all times. You move your troops with the right joystick.

You win this game by recapturing all your lands, a feat accomplished by successfully laying seige to each area's castle. Once you start a seige, the computer runs the battle. You will win a seige if you outnumber the defenders, but your troop strength is often reduced by ambushes that occur with distressing regularity, another realistic touch. Also, the enemy is likely to attempt to retake a castle they have just lost, so leaving a garrison behind is a must. This, of course, limits the amount of troops you can put in the field.

You can also confront an enemy army in the field—here's where those "rumors" come in handy. Since the enemy moves at the same speed that your armies do, you must head into them or cut them off; there is no catching up with them in this game. Again, once the battle is joined, the computer takes over, and again, you will win if you outnumber the enemy, especially in the key areas of knights and light cavalry. The odds are slightly in your favor if you are defending a castle, slightly in the enemy's favor if you are beseiging them, and equal for a battle in the field (assuming equal numbers of forces). This is an attempt to recreate the actual odds of medieval battles, where the defenders of a castle did have an advantage over an attacking army.

Earlier I said that you win the game by recapturing your lands. I find that this is not quite true. Once you have retaken your lands, the enemy launches anywhere from one to three more attacks. If you defeat these, you win. If the enemy recaptures one of your castles, the game continues with the enemy sending in increased numbers of troops, a touch you may not think of as a plus.

It takes several playings to get a feel for this game, but your skill increases with each round. Luck does play a part in this game, but skill and foresight can carry you through some bad luck. There is just enough randomness (the ambushes, the number of allies, etc.) to make the game a challenge at any level. The game played smoothly at all the levels I tried. Indeed, the only complaint I have is the slowness of movement of the armies. All the people I invited to try this game, adults and children, had the same complaint. Some also complained about the length of time some of the battles took, but this becomes a problem only if you have or are confronting really massive (20,000+) numbers of troops. The documentation (three typed pages) is more than adequate. The game has many little pluses, even including some humor in the documentation.

All in all, *Conquering Armies* is a winner — fun to play, and as challenging in its own way as some text Adventure games.

(Mitchell Software, P.O. Box 194, Tomahawk, WI 54487, 16K cassette or 32K disk $9.95 plus $1.50 S/H)

— Mark Williams

The Coco Greeting Card Designer

The Coco Greeting Card Designer can be used to design and print custom Greeting Cards for all occasions including: Valentine's Day, Birthdays, Mother's Day and more.

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The Coco Greeting Card Designer requires a Coco or Coco II with a minimum of 32k, One Disk Drive (Disk Ext. BASIC 1.0/1.1, ADOS, or JODS). Some of the printers that the Greeting Card Designer supports are: EPSON RX/FX, GEMINI 10X or SG-10, C-ITOH 8510, DMP-100/105/400/430, SEIKOSHA GP-100/250, LEGEND 808 and GORILLA BANANA. Send an SASE for current list of other compatible printers. See Review in April 86 Rainbow . . .

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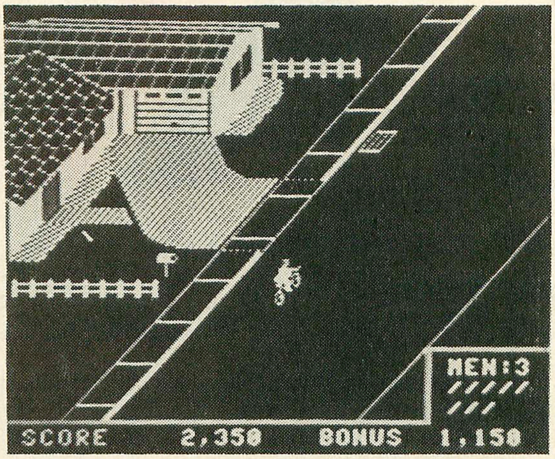

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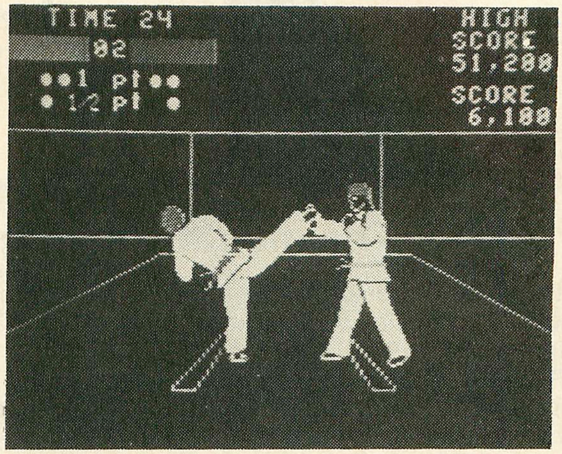

Challenge the computer, or a friend to a Karate match! In this game, you will use various Karate punches and kicks to knock your opponent down and earn points to win the match. When challenging the computer, your opponent's Karate skills increase as you win matches. This game is a challenge for even the expert game player.

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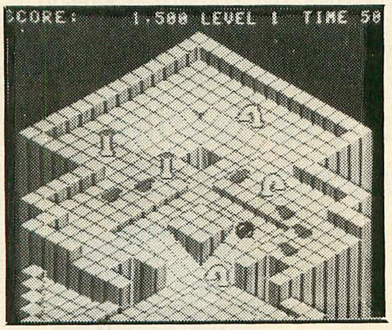

Move your marble around the mazes in your search for the finish line! Avoid the marble eaters, acid puddles and other creatures that inhabit the mazes. Avoid falling into holes or off the edges of the maze. Eight different levels and great graphics make this game a must for your collection. Congratulations to the contest winners!

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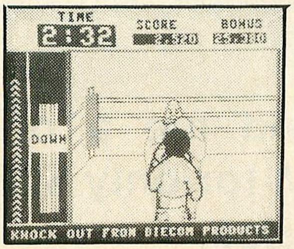

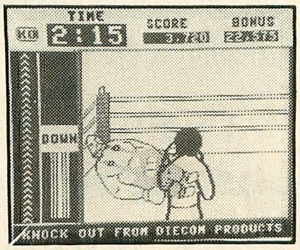

Fight against five different boxers in this great boxing game! At first the boxers are easy to knock out, but beware, it gets harder as you move on. The boxers are out to stop you in your quest to become champion of the world. But once you become champion your task is not over. You will then have to defend your title against those trying to regain the championship from you. Outstanding graphics make this a must for your collection!

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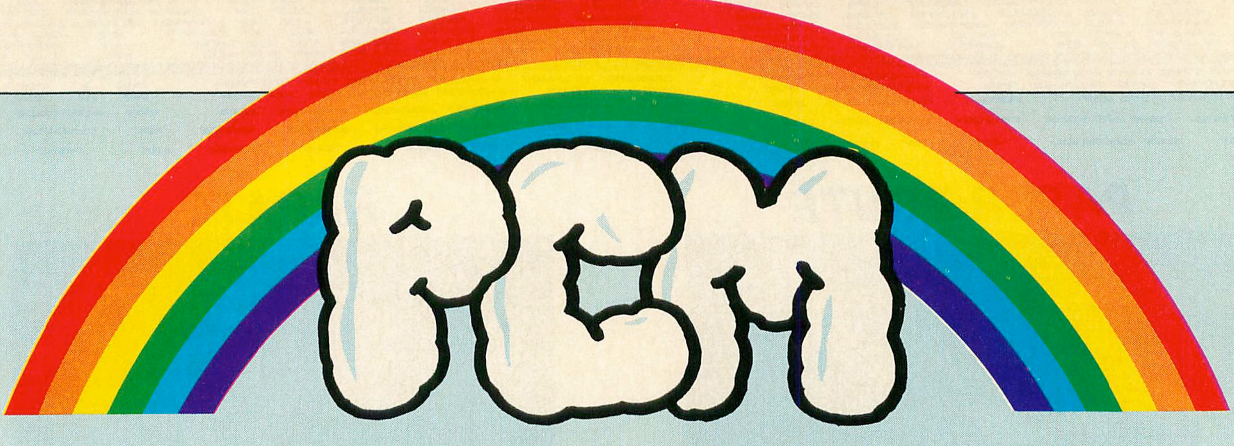

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Have a Starry, Starry Night with *Vincent Van CoCo*

Vincent Van CoCo (*VVC*) is a graphics utility that amazes you with the number of easy-to-use features provided for a price that would please even a tightwad. The program requires 32K ECB, a joystick or a mouse (two are preferred) and either a disk drive or cassette player. The disk version supports multiple drives but requires only one. *VVC* is supplied on a non-protected disk or tape, with an appeal to not make unauthorized copies. There is a registration card for the purchaser to fill out to receive news of future updates.

The author of *VVC* was especially careful to make the program easy for even a beginner to use effectively, but also versatile enough to be useful to the seasoned veteran. This user friendliness begins with a user's guide printed on a separate 8½ by 11-inch page, listing all 55 program options and the key combinations necessary to access them. Other software vendors would do well to include such a guide with software that uses many different options and key combinations. It is a breeze to use these features with this guide.

If you are entering requested data, the program gives you an opportunity to re-enter the data if you make a mistake. If an error does crop up, or if you are hopelessly lost, typing `GOTO2` gets you back to where you were without disturbing the picture you have been creating.

VVC allows you to create drawings through the use of either or both of the joysticks or mouse devices, or the arrow keys. You are presented with two cursors on the screen that are used to do the actual drawing. You select the color to be used as the background as well as the color in which to draw. *VVC* supports four color sets with both two- and four-color modes. The speed of cursor movement for drawing is under your total control. The arrow keys can be used to move the cursor one pixel at a time to allow for detailed drawing.

You can shrink or enlarge the drawing, copy one half of the screen to the other half (for a mirror image effect), flip any part of the screen upside down and even store the screen on the other graphics page. This allows you to experiment and if you don't like the results, just use the "original" stored on the other page. You can change the color of any part of the screen at any time. While you only have a maximum of four colors to work with, you may paint any part of the screen in any of 255 varieties of color patterns. If you want to create pictures to be used for window displays, you can scroll up to eight parts of the screen all at the same time and in any of the four directions. This makes for a mesmerizing attraction unmatched by more expensive advertising displays I have seen.

You can do the usual graphics editing things, like draw a box or a circle easily; cut a section of the screen, store it and later paste it somewhere else on the screen; turn on or off the color generated by movement of the cursor; replace or exchange colors on any part of the screen and store the results of your labor on cassette or disk for later use with *VVC* or your own BASIC program. *VVC* also features the use of text on the graphics screen and comes with four fonts and a utility that allows you to modify these or create your own (you are told you can use these in *VVC* but are not told how).

A unique feature of *Vincent Van CoCo* is the ability to scramble a picture so it looks like graphics garbage and thereby conceal it from the person who gains access to it without your approval and tries to view it with a BASIC program. A simple command unscrambles the picture to its original state. And speaking of access to the pictures, the documentation says that pictures created by *VVC* can be used with *CoCo Max*, *Master Design*, *Graphicom*, *Graphicom II* and *Bjork Blocks*. I can vouch for all but the last one (I don't own *Bjork Blocks*).

The author has included eight sample pictures that were created with *VVC* that will impress even the experienced user with the amount of detail.

The documentation consists of 20 8½ by 11-inch pages punched for a three-ring binder and stapled at the top. Also included is the one-page guide mentioned earlier. Each command and option is explained with enough detail to allow you to use it. Only in the explanation of the scrolling options does the language of the documentation require more than a beginner's knowledge of BASIC, and even this section is understandable overall to the novice.

Vincent Van CoCo is an excellent value in a graphics editor for the CoCo. It is a comprehensive graphics editor but not a full-featured one. You can spend more money and get more complex features in a similar program, but for ease of use and versatility at an affordable price, *VVC* will be difficult to top.

(Rococo Software, 3019 Sylvester Drive, Hartland, WI 53029, tape $17.95, disk $18.95)

— A. Buddy Hogan

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Grafix-3 is a Real OS-9 Bargain

Over the past four or five years, there have been a lot of graphics programs developed for the Color Computer. Many of them have been developed to take full advantage of CoCo's graphics abilities. Some, like *CoCo Max*, are extremely advanced, making their use and understanding easy, while others lack that extra something needed to make CoCo show its colors.

Recently, Aardvark Software released *Grafix-3*, a new graphics program for the Color Computer. The newness of it is that it is the first graphics program I've seen (other than programming in BASIC09) that is used under OS-9. That and the $20 price tag make it a worthwhile investment.

Grafix-3 is relatively simple to learn. It makes designing graphics much easier than programming in BASIC09 or any of the other programming languages available for OS-9, but there are some problems with it.

Since writing my first user's guide, I've been very critical of software documentation. Add to that almost 20 years of professional writing experience and you have someone who can get cynical about sloppy writing. *Grafix-3* is a program that shows the many reasons I am critical of documentation. *Grafix-3*'s documentation lacks illustrations and programming examples that would walk you through your first picture. Of the program itself, there are no program menus and no help options. You must learn the program and remember everything you've learned. This is far from the user-friendly, menu-driven software we've come to know.

On the other hand, there isn't a whole lot to remember. Pictures can be created using either the arrow keys or the right joystick. Use of the joystick does require some keystrokes to set some software switches before you can use the joystick. Either method works as documented and requires little or no user intervention.

Unlike most OS-9 programs, *Grafix-3* has made one mistake. Most OS-9 programs allow some table on disk that is referred to for setting printer attributes and control codes. In this method, *Grafix-3* could support any number of printers. Instead, it supports only two printers, the Tandy CGP-115 and the Okidata 82A. Neither of these printers is manufactured any longer, one of the risks of supporting a limited number of specific printers.

If you do any other programming requiring graphics, you'll be glad to find out that *Grafix-3* has a Hex command that allows you to dump the Hex values of each byte of the graphics screen to the printer or disk. This can allow you to later read the values in from a BASIC09 program and show the screen or even include them directly in your programs.

When you get to the bottom line, *Grafix-3* only costs $20 and does what it claims. That's a bargain for any program that works, and a real boon for OS-9 software. Considering all of these features, it is a great bargain. I'd recommend *Grafix-3* to anyone running a Color Computer under OS-9 who is looking for graphics capabilities.

(Aardvark Software, P.O. Box 60183, Palo Alto, CA 94306, disk $20)

— Bruce Warner

Software Review

Venture into the Jungle with *Treasure of the Aztecs*

Have you ever considered taking a vacation in Mexico and exploring the Aztec ruins? If you have, but could never afford to get there, now's your chance! That is, if one has a good imagination and is keen for computer Adventures, *Treasure of the Aztecs* will interest you.

This Adventure takes place circa 1520 — after Hernando Cortes conquered the Aztecs. You are among the soldiers searching the city to find the great treasure of the Aztecs. But there's a catch: you were rendered unconscious by some of the Aztecs during an attack. The last thing you can remember is following a trail into the jungle. Assuming your fellow soldiers are dead and the Aztecs are out there waiting, it is up to you alone to find the treasure while avoiding death.

Treasure of the Aztecs simply requires a 64K CoCo. There are versions for cassette and disk. I highly recommend using disk, since it would take an awfully long time to load in all the pictures from a tape. Joysticks are not required, as all input is through the keyboard.

To play, just type `LOADM"TREASURE"` or `CLOADM` for cassette. The program automatically executes when it's finished loading. After you get the title screen and hear the song, just press the space bar twice to begin. The disk is copy protected. All pictures are on the disk in some type of compressed format, and all are loaded into memory before execution. It takes approximately 50 seconds to load them in from disk. Having all pictures in memory greatly speeds up the game and saves wear and tear on drives. However, one annoying aspect is that on some screens portions must be painted, but this only takes a few seconds.

Game play is easy, especially moving around. All you have to use is the arrow keys, although at some points in the game you might have to type "climb." For example, if you want to "go north," you can either type it as such or just press the up-arrow key. An added feature of *Treasure of the Aztecs* is the Vocab command. Just type that and a brief list of possible commands are displayed on the screen. You can also quickly save or load previous games. So, if you think a dangerous spot is ahead, save the game before moving. The Help command also gives clues as to what should be done in certain situations. Last but not least, if you have a Radio Shack Speech/Sound Pak, it can be used for added sound and voice. While I am not impressed with Radio Shack's voice chip, it does add a special touch to the Adventure.

Treasure of the Aztecs is a very good program, entertaining for all ages. Scott Cabit, the program's author, did a nice job and I hope to see more work from him. If you're into graphics Adventures, I'm sure this one will keep you busy for hours. It did me, and I still haven't solved it! Good luck and happy hunting!

(Computerware, 4403 Manchester Ave. Suite 102-Box 668, Encinitas, CA 92024, requires 64K, cassette $24.95, disk $27.95)

— Darren Nye

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DeskMate — An All-Purpose Package for CoCo

By James G. Kriz

Beginning with the Tandy 1000, Radio Shack has been introducing an integrated software package called *DeskMate* for each of its computer lines — the MS-DOS machines, the Model IV and now, the CoCo. The term "integrated software" refers to a program that includes multiple applications instead of just one. The advantages of such a package include having just one program to do several different tasks, using similar commands in each different application and the ability to share files among the different applications. To see how *DeskMate* measures up to these advantages, it is important to remember that some comprehensive integrated packages for MS-DOS computers are real "core hogs" — often requiring over 512K of memory to run — while our CoCo has a practical limit right now of only 64K.

The *DeskMate* applications include a calendar, a text editor, a spreadsheet, a filer, telecommunications and paint (graphics drawing). In addition, it has a built-in calculator function that can be used anytime any of the other functions are in use.

DeskMate runs under OS-9 and includes enough of the OS-9 operating system to function completely without having to purchase that system separately. This means the user needs a 64K CoCo with at least one disk to use *DeskMate*. I would recommend a second disk for file storage, although it is not an absolute necessity. A joystick or mouse is also recommended for efficient operation — I used a joystick for this review although I think a mouse would have been better.

The functioning of *DeskMate* is similar to the idea originally developed by Xerox and made popular by the MacIntosh. The screen displays icons (pictures) to represent the available applications and an application is selected by moving a pointer to its icon using the mouse or joystick and pressing the firebutton. Within each application are pull-down menus. A bar across the top of the screen contains the names of available functions in that application and pointing to the name pulls down a menu showing the options available. For example, a common function is one called "Files"; pointing to Files pulls down a menu including such options as Open, Close, Save, Merge and Help. Every option has a Help selection that explains in more detail what the other options do. Moving the pointer to an option and pressing the firebutton selects it. Now, let's take a look at each of the applications.

The calendar function displays a one-month calendar on the upper half of the screen with the current day highlighted. Using joystick or cursor control keys, you can move forward or backward by day, month or year. The lower half of the screen is used to display reminder messages for the highlighted day. Messages may be entered, edited or deleted and are automatically saved.

The text editor function is a word processor that includes copy, insert and delete. It does not support any printer control functions; special printer features such as underline, expanded or condensed print, etc., are not available.

The spreadsheet is a simple program handling elementary spreadsheet functions. It is very similar to *Color Spectaculator.* Movement through the spreadsheet is accomplished using either the joystick or the cursor keys.

The filer uses the concept of index cards, and pictures the data on images of an index card file. Options include format of the index card, add, insert, delete, sort, search and print. The print simply lists all or selected records from a file. It cannot be formed into special formats such as labels.

The telecommunications application requires the use of the RS-232 Program Pak — it will not function through the standard RS-232 port. Of course, this means you also need the Multi-Pak Interface since the disk controller is already plugged into the ROM port. A modem is necessary as it would be for any communications. The telecommunications application seems to be one of the most comprehensive in this package. It has keystroke multipliers, allowing the user to define certain keys for multicharacter entries such as passwords and user IDs. It allows setting of Baud rates, parity, word size, stop bits, line feed option and echo. This application is also capable of sending and receiving files.

The paint application wins the award for most fun. It is similar to the "famous" *MacPaint* for the MacIntosh. Through the use of pull-down menus, the user can select either the two-color `PMODE 4` with its pseudo colors or the four-color `PMODE 3`. Different tools are also selectable including a pencil, line, circle, paint brush, spray paint, eraser, etc. The palette option offers a wide choice of patterns and colors for filling shapes. Drawing can be accomplished by using either a mouse, a touch pad, a joystick or the cursor keys. I feel the mouse or pad would work best.

One small problem is the joystick input only resolves 64 by 64 points while the drawing is the 256 by 192 `PMODE 4` screen. This makes it difficult to align two lines or to precisely position a point. Pictures made using paint can be saved and recalled later for viewing or changing. Pictures can also be printed using a Radio Shack graphics printer. However, there is no provision for specifying non-Radio Shack printers such as Epson or Okidata.

All *DeskMate* applications can save and load files and each file is linked to the application that created it. This means by selecting a file, the application that created it is first automatically loaded and then the file is loaded by the application. In other words, if a user is on the main menu screen and selects a text file, the text editor is first loaded and then the text file. *DeskMate* also allows limited linking of files across applications. It is possible, for example, to save a segment of a spreadsheet as text and merge that with text data in the editor as you might wish to do in certain business applications. I did not, however, find a way of mixing text and graphics in the same application.

In general, the package is easy to use and it is difficult to really mess things up. The inexperienced user can safely try things without worrying about losing files. If, for example, you create some text using the text editor and then try to exit that application, it asks if you want the data saved and prompts for a filename. The documentation is very comprehensive, covering a total of 186 pages. It is well-done but there are a few points that could be more clearly explained. For example, in several places in the manual the user is encouraged to use a second disk for file storage since *DeskMate* is large and disk-intensive in its operation. However, there are no clear instructions in the manual as to how to designate to *DeskMate* that the files are to be placed on a disk in Drive 1. The answer is to select the "folder" on the icon bar. The folder allows the changing of some of the file attributes including the device allocation. Simply change one of the file folders to `/D1`. *DeskMate* stores this on the system disk so it is not necessary to change the defaults every time the program is loaded.

This brings up another point. *DeskMate* is not protected and the user is encouraged to make a backup immediately. I strongly concur! Disk-intensive *DeskMate* seems to be constantly reading and writing, so save your original and work from a copy. Other than a few minor flaws in the documentation, the only other problem I found is that the user can only select two printer Baud rates — 600 or 1200. I have an Okidata 92 and having to use 1200 Baud holds it back from running at its full capabilities.

My overall opinion is that this is a well-done program, easy and fun to use. It does a good job of showing off just how much can be done with our favorite computer. But, should you buy it? The text editor is no match for full word processors like *Telewriter-64*. The spreadsheet can't compare to *Elite*Calc* or *DynaCalc*. The filer has many nice features but not as many as the better database programs. In other words, this single package can't provide everything you'll ever need. I think the best marketing of this package would be to include it as part of the purchase price of a new CoCo just as is now done with the Tandy 1000. *DeskMate* provides a good overall set of applications that would suffice for the novice until he or she can access their needs and can acquire the specific software for those particular needs. In addition, the calendar, paint and telecommunications applications may be all the average user would need or want in those areas.

(Tandy Corp., available in Radio Shack stores nationwide, requires 64K and one disk drive, $99.95)

One-Liner Contest Winner . . .

This one-liner is called *Catch*, and that pretty well describes what the red and blue boxes are playing.

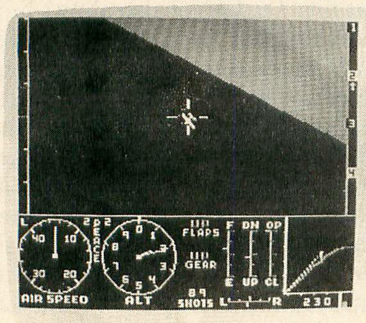
The listing:

```
1 CLS:PRINT@164,CHR$(191):PRINT@
187,CHR$(175):E=128:Y=20:B$=STRI
NG$(20,143)+"*":FORA=1TO22:FORX=
1TOY:NEXTX:PRINT@165,MID$(B$,A,2
2);CHR$(143);:NEXT A:E=E+1:SOUND
191,1:FORA=22TO1STEP-1:FORX=1TOY
:NEXTX:PRINT@165,MID$(B$,A,20);:
NEXTA:E=E-1:SOUND100,1:RUN
```

Bill Bernico
Sheboygan, WI

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

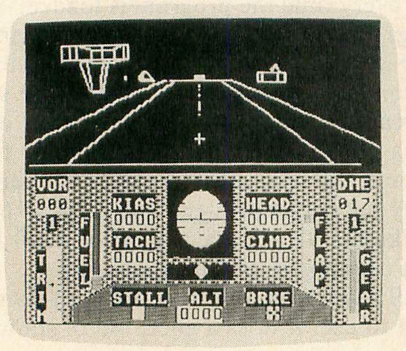
TOM MIX'S MINI-CATALOG



P-51 Mustang Attack/Flight Simulation

The ultimate video experience! Link two CoCo's together by cable or modem, and compete against your opponent across the table OR across the country! (Both computers require a copy of this program). The P-51 flight simulator lets you fly this WWII attack fighter in actual combat situations—against another player OR against the computer.

32K Machine Language
Flight Manual Included
Tape $29.95 Disk $34.95



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Real-time simulation generates panoramic 3-D views of ground features as you fly your sophisticated plane in any of nine different "worlds." Program models over 35 different aircraft/flight parameters. Realistic sound effects too! Manual included helps you through a typical short flight.

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—Dr. Scott L. Norman
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32K Machine Language
Flight Manual Included
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64K TDBII $59.95 Disk Only
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Factpack—Three programs for home or school use provide drill and practice with basic "-/+/÷/x" Grades 1-6.

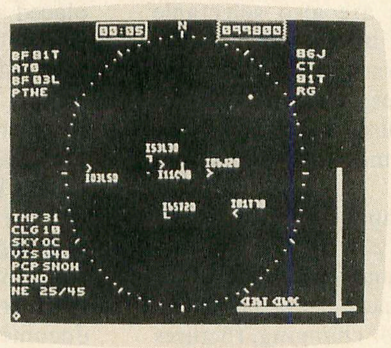
32K Ext. Basic
Tape $24.95 Disk $29.95

Vocabulary Management System—Helps children learn and practice using vocabulary and spelling words. Eleven programs including three printer segments for tests, puzzles, worksheets and five games; many features make this a popular seller!

Requires 16K Ext. Basic/
32K for Printer Output
Tape $39.95 Disk $42.95

Math Duel—A challenging math game that pits you against the computer in a game of wits. Use your knowledge of factors, multiples and prime numbers to gather points against your CoCo.

32K Ext. Basic
Tape $30.95 Disk $35.95



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"Caught in a blinding snowstorm, two jet airliners are on a collision course. The pilots are unaware of the imminent danger. Hundreds of lives are at stake. A high-speed disaster is inevitable unless you act fast..." This and many other exciting scenarios await you as an Air Traffic Controller. The thrills, challenges and frustrations you'll experience with this authentic, real-time simulation will give you countless hours of discovery and adventure.

No Joysticks Required
Comprehensive Manual-Reference Guide
32K Machine Language
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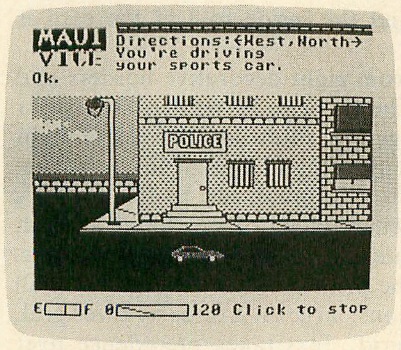


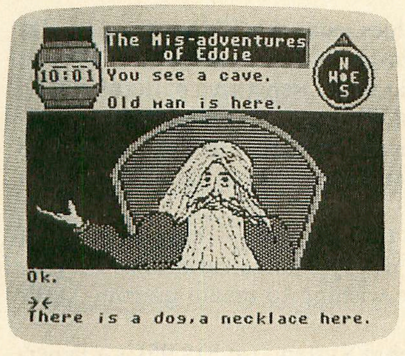
```
MAUI VICE  Directions:<West,North>
           You're driving
           your sports car.
Ok.
POLICE
E[    ]F 0[      ]120 Click to stop
```

New Release

Maui Vice

Step into the shoes of Crockett & Tubbs, and gather evidence, photographs and witnesses to convict your suspects! With "windows" to select your options, hi-res graphics, and a new story generated each time you play. This is state-of-the-art that guarantees excitement and newness every time you play.

64K Ext. Basic & Joystick Required
Tape $18.95 Disk $21.95

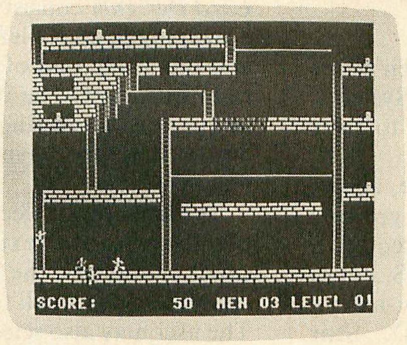


```
The Mis-adventures
     of Eddie
10:01  You see a cave.
       Old man is here.
Ok.
>(
There is a dog,a necklace here.
```

The Misadventures of Eddie

Another great Novasoft adventure. The ol' man in the mines' rebellious son, Eddie, is roaming through time, creating havoc—and you must bring him home in order to return to your own time! Over 140 locations, 50+ commands, in hi-res graphics. Experienced adventurers will love this one!

Requires 64K
Disk $21.95

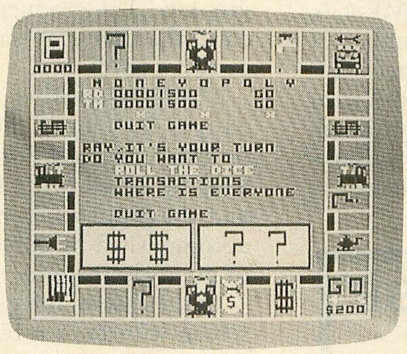


```
SCORE:        50  MEN 03 LEVEL 01
```

Goldrunner

Travel the maze in your never-ending search for gold—but beware of trap doors, burly guards and other hazards! 33 screens.

64K Joystick or Keyboard
Tape $14.95 Disk $17.95

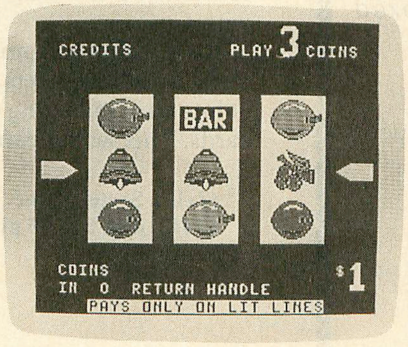


```
M O N E Y O P O L Y
00001500      GO
00001500      GO

QUIT GAME

RAY,IT'S YOUR TURN
DO YOU WANT TO
   ROLL THE DICE
   TRANSACTIONS
   WHERE IS EVERYONE

   QUIT GAME
```

Moneyopoly

Play the popular board game on one of the most realistic computer game simulations ever! Contains all the features of the original. Buy, sell, rent, wheel & deal your way to fortune.

32K Joystick Required
Tape $19.95 Disk $22.95



```
CREDITS            PLAY 3 COINS
               BAR
COINS                          $1
IN    0   RETURN HANDLE
   PAYS ONLY ON LIT LINES
```

Vegas Game Pak

Six games in all! Blackjack, Keno, Video Poker & 3 slot machine lookalikes. Super graphics!

16K Ext. Basic Required
Tape $24.95 Disk $27.95

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Dragon Slayer—Defeat the dragon by finding your way through a mountain maze. Gather treasure but avoid the deadly traps! 160 exciting screens.
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Disk $24.95

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Draconian—
32K Tape $19.95 Disk $22.95

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Send Personal Wishes with *CoCo Greeting Card Designer*

The CoCo Greeting Card Designer is the maiden effort in the Color Computer software market for Zebra Systems. If this package is an indication, I look forward to their subsequent efforts.

The program, on a non-copy protected diskette, allows the user to easily design and print personalized greeting cards for any occasion. A 32K CoCo or CoCo 2 is required, with one disk drive, Disk BASIC 1.0 or 1.1, or JDOS. Zebra Systems' list of tested compatible 80-column, dot-matrix printers is: Epson RX-80, FX-80, Gemini 10X, Star Micronics SG-10, Panasonic KXP-1090, KXP-1091, Memotech DMX-80, C. Itoh 8510AP, 8510AS, Leading Edge Prowriter, Seikosha GP-100, GP-250, Gorilla Banana, Radio Shack DMP-100, DMP-105, DMP-110 and DMP-400.

The list also includes a number of printers that have not been tested but may be compatible (including the DMP-430, which I used with no problems), as well as a number of printers that are not compatible. The Radio Shack LP Series is included in this latter category, and indeed, I tried the program with a LP VII without success. If this program interests you, my advice is to contact Zebra Systems concerning compatibility if your printer is not on the above list.

The documentation is very clearly written and easy to follow. The program itself is menu driven and so logically organized that, after the first time through, you'll find yourself referring to the documentation only to select graphics icons and borders from the pictures there.

The finished product created using *The CoCo Greeting Card Designer* consists of the cover of a card (printed upside down) in the upper-left quadrant of an 8½ by 11-inch sheet, and the inside fold of the card (right side up) in the lower-right quadrant. The result is that when the sheet is folded in quarters, a greeting card is created. The process used to design both the cover and the inside fold of the card is identical.

The user may select from eight decorative borders and two fonts for the text. The text can be written in large or small characters, the large font allowing six lines of eight characters; the small font allowing 13 lines of 16 characters. The user may also select from 21 pre-drawn Hi-Res graphics icons, many in holiday themes. Included are a heart, a cupid, a birthday cake, a graduate and several Christmas symbols.

These icons can also be printed either in large or small formats at selected locations: large on a three by three grid, small on a six by six grid. Text takes precedence over graphics, so letters are legible when superimposed over graphics. The product is impressive. As well as printing the card, the user may save it on disk, load a card from disk or edit a card.

The more creative user has the option of creating unique designs for any of the three elements: text fonts, borders or graphics icons. The text characters can be designed on a 12 by 20 grid, the border elements on a 12 by 12 grid, and the graphics icons on a 32 by 56 grid. The editing is accomplished by cursor movement and setting or resetting of points in the grid.

In the case of the graphics icons this is done on a Hi-Res screen with both a blown-up and near actual-size version appearing on the screen at once. Repetitive patterns can be quickly created using a Repeat command. The 1,792-element grid allows intricate designs. The custom designs of any of these three elements can be saved to mix and match on later card creations.

This program is well thought out — easy to use, yet flexible enough to allow nearly endless variations. I highly recommend it to anyone wishing to create greeting cards with CoCo.

Also available from Zebra Systems (at $19.95) is a Paper-Pack with 120 sheets of pinfeed computer paper in three colors with matching envelopes just the right size for these cards. This would certainly spruce up your creations.

(Zebra Systems, Inc., 78-06 Jamaica Ave., Woodhaven, NY 11412, disk $24.95 plus $3 S/H)

— Stanley Townsend

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Color Essential Math — A Good Teaching Tool

This was the first time I've been able to sit back and watch while one of the kids voluntarily took a piece of software for a spin.

Cindy is 11 and in the sixth grade. She was having some problems with math facts when this package arrived for review by a happy coincidence. She was able to run the disk version of *Color Essential Math* on her own and find her own skill level. We were especially happy to find the cursor waiting for right-to-left answers (as you'd actually calculate).

Volume I of *Color Essential Math* is designed for classroom use but it's written so a parent could use this as an aid at home. The package includes both the disk and tape versions along with a 26-page manual in a white plastic three-ring binder. It's for practice of addition, subtraction, multiplication and division, and includes place value, rounding, factoring, exponents, square and conversion of fractions to decimal.

Grade levels aren't discussed or noted, but I'd say this would help at any grammar school level. My own kids, third grade through sixth, were all challenged by it. This package doesn't replace the need for a nearby parent or teacher to explain basic ideas. It does provide lots of practice nailing down what you've learned.

The manual assumes your computer is set up, but it does explain every step after that, including making of backup copies. The teacher is told how to set up for a placement test and options for varying time (one to 99 seconds) and number of problems per lesson (one to 99).

A promotion/demotion feature can be turned on or off. When on, it automatically moves your student along to the most appropriate next lesson or drops back for more practice on a weak point. Each lesson is outlined along with two examples of the problems your student is asked to solve.

The manual doesn't try to explain math concepts . . . just how to use the programs. But this should pose no problem. The manual does have very detailed, step-by-step explanations with pictures so that either a parent or teacher can understand how to use the lessons for their own child or a classroom of children at different levels. I was impressed with the obviously professional care they took in explaining teaching concepts so even I could understand.

The planning, guidance and examples in the manual reflect the work of professional educators at Bertamax, who have licensed Volume I to Tandy.

The student doesn't need a manual because all entries are prompted on the screen and errors are trapped and explained. Impatient students who want to forge ahead can press any key to clear a correct answer and bring on the next problem at their own pace (and end a frustrating wait for the next problem).

The program does give an on-screen progress report whenever requested, but it doesn't make any permanent record, and there is no save option. You or your student must write down where he or she stopped so they'll know where to pick up when coming back for future lessons.

I do wish they had included more work on basic fraction concepts. My fifth and sixth grade girls both need help there. Dave (third grade) wanted time with the program, too. The program treats each child individually, so each one can earn "Good Job!" at his/her own level. I can honestly say all three enjoyed the challenge of *Color Essential Math.*

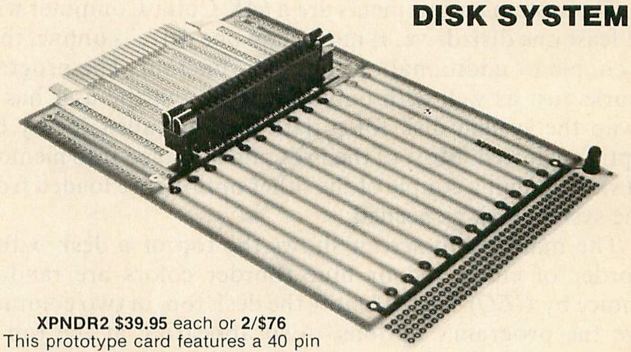
(Tandy Corp, 1400 One Tandy Center, Ft. Worth, TX 76102, Catalog No. 26-2643, disk/tape $120)

— Bob Dooman

Hint . . .

All 'Caps' Down

Are you trying to switch from upper- to lowercase from within a BASIC program? To accomplish this, type `POKE 282,0`. To return to the uppercase mode just type `POKE 282,255`.



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Complete Electronic Organizer — Options Galore to get You in Order

By Robert E. Foiles

This may not be the usual way to start a review, but the "bug trapping" routine in *Complete Electronic Organizer* (*CEO*) is so unique that it rates being first.

Built into *CEO* is a system-monitoring subroutine that kicks in if a program error is encountered. This routine takes over the program and prints to the screen a message instructing the user that a program error has been encountered and the disk should be returned to Computerware with an explanation of what the user was doing just before the message appeared. Unfortunately, the routine also locks up the program and only a total system shutdown restores control of the computer to the operator.

In the first run-through of the program the "bug trap" snapped and the original disk with my explanation as requested was shipped back to Computerware. A few days later a reply acknowledged receipt of the disk and noted it had been sent back to the programmer for review. Six days later, the corrected disk was mailed back (very good turnaround time, considering this exchange had to take place just before Christmas and from east to west coast).

CEO is full of surprises, as you will learn, and most of the surprises were welcomed. Overall, *CEO* is a graphics delight. The program uses a 51 by 24 Hi-Res display for all its screens and has more options than a politician has excuses.

The system requirements are a 64K Color Computer with at least one disk drive. If more than one drive is online, then a couple of additional options can function. The program works just as well with only one drive, but the user has to swap the system disk for a data disk as called for by the option selected. Most of the program is loaded into memory at startup, but a couple of the other options are loaded from the system disk as needed.

The main menu screen shows the top of a desk with a border of either red or blue (border colors are random choice by *CEO*). Listed below the desk top, in two columns, are the program's options. Also appearing at the top of screen is the date and on the right side is a real-time clock. The user's name also appears after a "Good Day" message.

To get the main menu, the program has a start-up routine that asks the user to enter the number of disk drives in use, Baud rate for the printer, user's name, the time and date. It also provides for the formatting of the data disk needed for either a single- or double-drive system. The disks must already be initialized for use in the drives (e.g., using the `DSKINI` command) and the program establishes the "tables" where the data is stored. When *CEO* asks for the time to be entered, it expects the time to be in a 24-hour format, i.e., 5 p.m. is entered as 1700. The date is entered as MMDDYYYY, i.e., 01011986 for New Year's Day. If the user does not change the system configuration, the program uses the previously entered data and only asks for a new time and date on future runs.

The main menu displays the entered date and the time with the first digit, either a 'P' or 'A', followed by the hour and after a blinking colon, the minutes. The clock functions throughout all the options even if it is not visible in some screens. Since the clock is running in the background it is possible to use the alarm feature to sound off at the user's selected time.

From within the main menu, the user is able to select any of the options by moving the box with the arrow keys so it encloses the option wanted. Tapping the ENTER key loads and/or executes the option within the box. Some of the options execute within the main screen and three others have separate screens. The first group of options take care of the housekeeping for the program and are called up individually or by selecting the "Other Things" option. The main menu options are:

1) Set Time allows the user to set the correct time, which might have been slowed because of extensive printer use.

2) Adjust Time provides a means of correcting the speed of the clock for accurate time.

3) Alarm Set/Reset allows the user to preselect one time for the alarm to sound. This clock program "beeps" on the hour, but the alarm sounds a tone for almost a minute or until the space bar is pressed.

4) Set Date allows the user to enter a new date after the start-up routine. While not covered in the manual, this option is necessary to move from one year to another. The program appears to have been designed to handle only one year at a time and will not move into a new year without using this option. A word of caution: If a new year is entered with the Set Date option, *CEO* overwrites the information in the data disk. The program prints to screen the month and year as entered at startup or as entered with Set Date and reads the saved data from the data disk, regardless of the year saved on that disk. The user must be sure to mark each data disk with the year on it to avoid such problems.

5) Other Things option brings up a submenu of additional options: A) Set Baud Rate allows for a change of the Baud rate if the data is not entered at startup or if the user changes his system configuration with a new printer. B) Change # of Drives allows the user to add a second drive and adjust the program to accept the second unit online (or vice versa). As noted earlier, a couple of additional options come into play with two drives online. C) Change the Name provides for another individual's name to be entered on the "desk top" of the main menu screen. D) Return to Menu does just as the name suggests. E) Format a Data Disk turns an initialized blank disk into a data disk for the system to use. While not covered in the manual, when data or dates are to be entered into a new year, a formatted *CEO* data disk must be ready to receive the information. Thus, if a data disk had not been prepared for the new year, the user has to abort the option in use and return to the main menu to format a data disk. F) All of the Above option actually does a total start-up routine that covers all the steps needed to adapt the program to the user's configuration. G) Done for the Day is the command used to return to BASIC. It is the only safe way to exit the program without losing data. To get to this decision, the user must be in the main menu, then get into the submenu and answer "yes"; this is a somewhat cumbersome way to exit the program. It would be more convenient for the user if the Exit Routine was one of the major main menu options and maybe have the clock speed adjustment option become part of the housekeeping subroutines.

The Calculator option draws the face of a standard pocket calculator as an overlay on the main menu screen. The calculator has a border of either red or blue depending on the color of the border around the desk. The design does brighten the screen. The graphics display of the calculator has a window into which the figures are entered from the computer's keyboard. The unit operates as a four-function calculator (add, subtract, multiply and divide). The usual keyboard keys are used to control the procedures. There is room for a nine-digit result and the digits are entered from left to right. If the results of a math operation require more than the nine spaces, the readout is given as a natural exponential of the number and no further number crunching is allowed. The CLEAR key must be tapped to start another math problem. The 'S' key may be used to change the sign of a number. To end the option and return to the main menu the '@' key is used.

The remaining main menu options have their own individual screens. For many users, the Calendar option will be the most frequently used option because of the many ways it can be set up and used.

The Calendar option draws a familiar calendar with blocks and dates. The month presented the first time is the month of the year as entered in the start-up routine (or through the Set Date suboption). The day of the month is enclosed in a set of brackets. The days of the month are selected by moving the brackets with the arrow keys. Once a specific day of the month has been selected, tapping the ENTER key brings up a new screen.

Across the top of this screen is a row of icons depicting operations that may be called up by moving the pointer under the specific icon (with the arrow keys) and tapping the ENTER key. Just below the icon line is a space for the name of the first item on the Clipboard to flash. Under that is the line that shows the name of the day of the week and the date (month, day, year) under consideration. Below that is a Special Occasion data field for a 32-character message to be logged. Below that line are 10 hourly entry fields (limited to 15 characters each) followed by a Memo field, which is also a 32-character field. When the program is first executed all these fields are empty until the user loads in appointments and saves the data. The dozen data fields are the backbone of the data entry of the calendar and are recalled from the data disk whenever that date is requested. A special feature of data entry into the Special Occasion line is that this date on the calendar has its number highlighted. Thus, when a month has any Special Occasion dates recorded, they are quickly visible.

The program automatically activates the keyboard icon upon entry into scheduling operation. The icons depict the operation they support and the user can always tell which icon is operational because it is in inverse image. Because the keyboard option is active upon arriving at the selected date, the user can move the highlighted box down the appointment time lines with the arrow key to the selected time. The ENTER key is pressed and a blinking cursor appears at the head of the highlighted line allowing data to be typed in. When finished (15-space limit), the ENTER key is pressed again to hold the data in place and the user can move to another time line. To save the data entered for that day, the user moves the pointer to the disk icon and presses ENTER. A new submenu pops up.

The user now must choose to save the date, save the data to another date or both, return to the day for more work, or return to the calendar and not save the data. An option is selected by moving the pointer in front of the option wanted and pressing ENTER to execute. With two disk drives online, the program is supposed to be able to transfer a Special Occasion date forward to another year to save typing in all those items. If this selection is attempted, a screen message shows up telling the user to insert a blank data disk in Drive 0 to receive the data. However, the program reads that disk, reports "disk not blank" and aborts the transfer. The same message appeared with a blank disk (not a formatted data disk).

There are six additional icons to choose from while on the scheduling screen. The Help icon can be invoked and when the pointer is stopped under any of the other icons, pressing the ENTER key produces a Help screen of specific instructions for that icon. A handy feature when you don't want to go searching for the manual to look up something.

The Scissors icon is used to cut a specific data field from the display screen. Once cut, the data field can be pasted to another field, tacked onto the Clipboard or even put in the "Trash Can." The cut and paste operation helps move data around within the same day without having to retype it, and by posting the data to the Clipboard, the data can be transferred to another day within the month or to another month of the same year. The Clipboard can hold

Hint . . .

Disappearing Act

If you want to disable the output to your screen, just type `POKE 359,255`. This causes the computer to appear to be locked up. Remember that any entered command will be executed, but the text will not appear on the screen. To get out of this and allow screen output, just type `POKE 359,126`.

One-Liner Contest Winner . . .

If you enjoy word games, *Anagram* may help you with the guesswork. It takes any word you enter and randomly scrambles it. This means you don't have to decide how to best scramble the word.

The listing:

```
0 INPUT"WORD";A$:L=LEN(A$):FORJ=
1TOL:R=RND(L):T$=MID$(A$,J,1):MI
D$(A$,J,1)=MID$(A$,R,1):MID$(A$,
R,1)=T$:NEXTJ:PRINTA$
```

Bruce Wulfsberg, M.D.
Moorestown, NJ

(For this winning one-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Adventures* and its companion *The Second Rainbow Adventures Tape*.)

up to nine data fields in storage and the actual number of items stored are listed on the Clipboard outline. The top entry in the Clipboard file is flashed on the Clipboard data line just under the row of icons each time an icon is accessed as a reminder. If several items are posted on the Clipboard it may be necessary to remove the top items (by selecting the Scissors and the Trash Can icons) to get to the correct item to transfer. It takes some work shifting between icons to get the job done, but once familiar with what comes first, it really becomes fun to switch data around with just a couple of keystrokes.

Another icon is the Duplicator. This icon allows for a duplicate copy of a data field to be created. For example, an item placed on Clipboard might be copied with Duplicator and moved to more than one location.

The last icon is the Printer, which produces reports on a printer. Since no graphics symbols are used in the printouts, there are no special restrictions on the types of printers that will work with *CEO*. *CEO* produced preformatted reports on both an Okidata 82 and a DMP-200 printer without problems.

The Printer submenu allows for a printout of just the selected day being worked on, a printout for a week starting with the selected date, prints a monthly calendar (with the Special Occasion dates set off by asterisks) or prints out a listing of days by "key word." A search for a key word such as "birthday" or "doctor," between specific dates, produces a printout of those days. The key word to be used in the search must be exact or it will not be found. Again, there is a little extra effort by the programmer to set up a check in the system to see if a printer is online or not.

Maybe the most useful report to be printed is the single page "week-at-a-glance" printout. Each day is printed with its day of the week, date and year and two columns of "Today's Schedule." To exit the Calendar option and return to the main menu, the 'Q' key is tapped.

The Phone Directory option also has its own screen and commands and handles up to 192 names and phone numbers in a fast and friendly way. The user is permitted to select one of six suboptions by moving the pointer to the proper selection and pressing ENTER. To add a person to the file, the Add Names suboption is selected and the user is presented a place to enter a name (up to 32 characters); by tapping ENTER the cursor moves to the phone line awaiting the number (up to 14 characters). Pressing ENTER again offers another sequence. Pressing ENTER with no entry returns the user to the menu.

The manual suggests that entries be made with the last name first so when the program automatically sorts the names alphabetically they are in acceptable order. It is interesting that the Find routine locates a name in upper- or lowercase or presents name(s) and number(s) of all that group if only one letter is entered (i.e., just a 'v'). Pressing ENTER lists the total file.

One small quirk in this section is when the Change of Name suboption is used, *CEO* writes the old name to the screen and leaves it there even after the new name has been committed to the file. The screen stays cluttered until the user goes back to the main menu.

The Note Keeper rounds out the complete organizing functions of *CEO*. Six of the 15 pages of the manual are devoted to suboptions of this section.

The data handling of this "free-form file drawer" is supposed to be made easier by the use of single letter codes. However, among the suboption codes is the use of the same letter code to accomplish different missions — confusing to say the least. Due to what must be a typing error, the manual also lists a key to be used as a command, but the Color Computer keyboard does not include such a key.

The manual states that up to 479 records can be stored on the data disk, depending on how long each record might be. An individual record may be as long as 5,400 characters and its title must fit into a maximum 48-character line. The record titles are stored in an index file that can be called up for viewing. An individual record can be called up by title directly, and any record can be edited, have lines added or deleted, or be printed (a line at a time or total record).

There are three different "search" routines in the command list. Two of the routines are used to locate a record by finding a key word within the title of the record. The `GET` and '?' command worked. However, all too frequently the only response with Find (which was to locate a key word in a record) was a screen message "<E> Sorry No Match."

The data entry into a record is not very user friendly in that only 230 characters are all the program accepts at a time. It is frustrating to be typing along from a source and realize the program had stopped accepting data a couple lines back. However, pressing the ENTER key moves the cursor down to an empty line and more data can be entered. The manual does not explain or warn the user of this little quirk. Also, trying to free up space by removing some records proved to be less than complete. While the record was gone from the disk, the title of the record remained in the index.

On the bright side, the programmer created several special handling procedures that are great. The user can toggle the scroll rate from fast (default) to slow. The slow scroll of the data is smooth as it moves up/down the screen. There is also a disk housekeeper routine that can be called. The Organizer command packs the disk to make the best use of the space. The manual notes that the system automatically invokes this command if the user tries to save a record and there is not enough room for it. The program provides a fast means to check disk space available and storage space in memory. The report gives the size of the record in memory (in bytes), the remaining amount of memory, the number of free records left and the amount of free disk space remaining.

The last option is the Memo Pad, which allows the user to create *one* record (up to 5,400 characters) as the only entry in that file. This record can be called to screen or printed out. If a new memo is entered, it replaces the former message.

CEO has many bells and whistles that work and are not just for show. However, the database portion of the program would not be my choice as a tool to use often. If someone wants an excellent appointment scheduling program, *CEO* is worth considering. The Calculator option may be useful to have online for those who might want to keep *CEO* up and running for most of the day and need a fast math job done. On balance, the appointment scheduling portion carries the day for *CEO*.

The manual, 15 half-pages in length, covers most of the functions in detail. There are some omissions and typos that make the manual better than some, but with room for improvement.

(Computerware, 4403 Manchester Ave., Suite 102-Box 668, Encinitas, CA 92024, disk $49.95 plus $2 S/H)

Panic Button is Fun for All Ages

Imagine yourself working on an assembly line. Your job is to assemble one of the following six items: robot, house, cake, lamp, phone or TV set.

To play the game, you need to follow these simple directions: 1) insert game cartridge, 2) plug in left joystick, 3) turn on your CoCo, 4) turn on your TV set.

The first screen allows you to set the level of difficulty you want to use. There are three difficulty levels to choose from — 1, 3 or 7. Number 1 is the easiest and number 7 is the hardest level of play. I suggest that everyone start at Level 1 until they get used to playing this game.

After choosing the level of play, the computer shows you how to assemble an item and how many items you need to assemble in the allotted time. When you are ready to play, just press the left joystick button.

You are now in the assembly room and the different parts of the item start falling onto the conveyor belt. Your job is to assemble the item correctly and send the completed item to the shipping dock. If you don't assemble the specified number in two minutes, you are fired.

But don't despair if you find yourself falling hopelessly behind; you can always press the panic button. This stops the conveyor belt for approximately 15 seconds and allows you to try to catch up. Be careful about using the panic button, as your foreman really frowns upon its use.

If you successfully complete your assignment by assembling the correct number of items in the specified time limit, you advance to the next level. The next level will have you assemble a different item, plus one more item than you did in the previous level.

When two levels of play are completed, you receive a reward. Could it be you get a raise in pay? Or maybe you will get a day off? No, if you successfully complete two levels of play, you get to throw a cake in the foreman's face! How sweet it is!

When I received *Panic Button*, my whole family sat down around the CoCo for what turned out to be a really exciting evening of playing. Alice (my wife) got fired so many times, the foreman almost hated to see her go in to "work."

My children (Lisa is 11, Eddie is 7) both enjoyed *Panic Button* very much. When they started playing, they couldn't make it past the first level of play. But after a few games, actually quite a few games, they were doing great!

Panic Button turned out to be a lot of fun, but watch out — it can be addicting!

(Tandy Corp., available in Radio Shack stores nationwide, requires 16K and joysticks, $19.95)

— John H. Appel

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Two-Liner Contest Winner . . .

Type in *Scroller* as listed. Once you have seen what it does, change Line 1 to meet your own needs. This can be a pretty useful subroutine, too.

The listings:

```
0 CLS:PRINT@257,STRING$(30,42):P
RINT@129,STRING$(30,42):Q=28:REA
DA$:FORX=1TOLEN(A$)+28:Q=Q-1:Q=Q
*SGN(Q):P$=MID$(A$,X+(Q-27),28-Q
):PRINT@194+Q,P$:FORT=1TO70:NEXT
T,X:RESTORE:GOTO
1 DATA DISPLAY ANY MESSAGE HERE
BY replacing this message WITH O
NE OF YOUR OWN IN LINE NUMBER 1.
 THE MESSAGE WILL BE REPEATEDLY
DISPLAYED AS LONG AS YOU LIKE.<>
<><><><<<MESSAGE SCROLLER>>><<<B
Y JIM COCKRUM>>><><><><>
```

Jim Cockrum
Martinsville, IN

(For this winning two-liner contest entry, the author has been sent copies of both *The Second Rainbow Book of Adventures* and its companion *The Second Rainbow Adventures Tape.*)

TRY-O-TAX Helps Organize Tax Preparations

I may not be the typical customer for *TRY-O-TAX*. I have been doing my own income tax returns for over 20 years, but always dread and hate the task. On the one hand, that means I search every year for a computer program to relieve the annual pain. On the other hand, it means I expect a tax program to do things very well that I already have much familiarity with. It may be I have higher standards of performance for tax software than the average person who is just trying to avoid a trip to an accountant.

I have used two of the earlier versions of *TRY-O-TAX*'s annual offerings, and was hoping for major improvements this year. The 1985 program arrived early, but because of review deadlines that allow readers to see this in the prime tax season, it meant I was doing the 1985 Income Tax (with partially bogus projected figures) immediately after Thanksgiving.

The 1985 version includes two impressive features. The first is an abbreviated program that allows the user to predict the following year's situation in order to estimate whether to change withholding or find a tax shelter. I found this mini-program quite useful for its intended purpose, and I would like to return to it each quarter throughout the coming year. I would buy that program separately as it is very user friendly, and while not too sophisticated, it did an excellent job.

The other feature is the ability to exit from the future estimation program by pressing a key that makes your computer (already pre-loaded with such information as your address) type out your order form for the following year's version of *TRY-O-TAX*.

TRY-O-TAX works and prints out only in integer math. While Uncle Sam will accept your tax return with all figures rounded to the nearest dollar, most of us do not do our income tax that way. This may seem minor since it is legal, but it annoyed me. When I entered items to the cent and checked, I found *TRY-O-TAX* carried out the math correctly before rounding to the dollar.

TRY-O-TAX forces the user to transfer the data from his printout to his Form 1040, and provides plain paper substitutes (which the IRS will accept) for all the other attachments, schedules and forms. (The IRS demands use of their form only for the 1040 itself, although it is customary to use IRS forms throughout.) This, like the rounded dollar example, is legal and acceptable to the IRS, but it can be a nuisance to some of us. Many taxpayers must provide a copy of their return to someone else (e.g., a former spouse or creditor) and the format of the plain paper result doesn't have a professional appearance.

Because the 1985 tax forms were not released when *TRY-O-TAX* went to press, the instructions warn the user that some line numbers may not match properly with the actual forms this year. The author states that correct 1985 tax rates and rules are used, and he seems (as far as I could check) to be correct.

TRY-O-TAX needs to be run two or three times before the final pass because limitations in punctuation prevent proper entry of some business names and other data; the computer does not like commas in the middle of string input. The documentation is poor on such minor points as how to enter both spouses' Social Security numbers to match the proper printout format. This is another reason the user should cycle through the program more than once. The computation of excess Social Security withheld from more than one employer was omitted entirely. For me, that computation can double or triple the refund due back.

In summary, *TRY-O-TAX* is better than the author's 1984 version and is useful in helping one organize and do the first rough pass. But for me, for reasons mentioned, I'll send in my final income tax return done manually.

(TRY-O-BYTE, 1008 Alton Circle, Florence, SC 29501, 16K cassette or 32K disks $29.95 plus $3 S/H)

— H. Larry Elman

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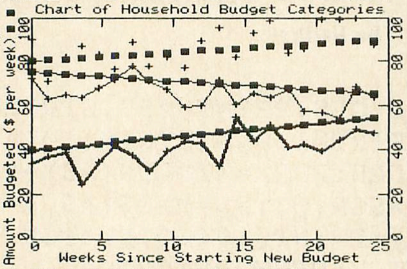

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Action Abounds in Fast-Paced *Knock Out*

Knock Out by Diecom Products is a fast-action boxing game for a 64K CoCo. The object of the game is to become the Boxing Champion of the World. In order to become champion you must fight and defeat five opponents. The first boxer you face is a real sucker. I was able to beat him on my third try. (Perhaps I should point out that I'm no martial arts expert.)

The first boxer makes a good practice opponent. Each new opponent becomes progressively harder to defeat, and as a matter of fact, I never got past the second boxer. I managed to knock down the second boxer several times but he always managed to finish me off first. I can only imagine how fast and smart the final challenger would be. To give you an idea of this second opponent, he resembles Mr. T.

Knock Out is a fast and action-packed boxing game. Your boxer is outlined and transparent. This allows you to look through your boxer and see your opponent. During the game you go at your opponent toe to toe.

Use the up arrow to move your boxer's hands or guard up, down arrow to move your boxer's hands or guard down, left arrow to make your boxer dodge to the left and right arrow to make your boxer dodge to the right. The 'Z' key makes your boxer punch with his left hand. If your boxer's guard is up, he punches to your opponent's head. If your boxer's guard is down, he punches to your opponent's body. The "?/" keys make your boxer punch with his right hand, with the same guard up/down aims. The space bar makes your boxer punch with a right hook if he has knockout power.

A knockout indicator is located on the left side of the screen. Each time you hit your opponent your knockout power increases. When you have enough power, the KO indicator starts flashing. If you hit your opponent when the KO indicator is flashing, you will take away a lot of his energy. However, your opponent tries to block your punch.

While your boxer is dodging, moving or punching, you cannot make another move; you must wait until your boxer completes his move before commanding another move. If you try to make a move while your boxer is moving, the second move command is ignored. Movement speed increases and boxer reaction time decreases as you progress through the five challengers.

On the left side of the screen there are two multicolored energy bars with the word "down" written between them. The top bar shows your opponent's energy and the bottom bar shows your boxer's energy. The boxer who lands a punch gains energy and the boxer hit by a punch loses energy. When a boxer's energy bar completely disappears the boxer is knocked down.

When a boxer is knocked down a countdown indicator is displayed in the upper right corner of the screen. If the count is less than 10 the boxer gets back up and some of his energy is restored. On the third knock down the fighter is knocked out and loses the fight. Each fight can last up to three minutes. If you do not knock out your opponent within three minutes you lose. After you knock out an opponent, you face another fighter until all five challengers are defeated. You must knock down each opponent three times, but your boxer can only be knocked down three times during the entire game. In order to win you must get through the first couple of fighters unscathed.

A bonus scoring counter is located at the top right corner of the screen. At the beginning of each fight the counter contains 30,000 bonus points. As time goes by the counter counts down. When a challenger is knocked out the count in the counter is added to your score. The faster you knock out an opponent the higher the bonus score, and as stated, your boxer also receives points for hitting his opponent.

Knock Out comes on disk or cassette and is accompanied by a brief user's booklet. The booklet is written clearly and is easy to understand. Following the instructions, I was up and playing the game in short order. If you buy the disk version, the 10 high scores can be saved to disk.

I enjoyed playing *Knock Out* because there is a lot of action and excitement in this game for a reasonable price.

(Diecom Products, 6715 Fifth Line, Milton, Ontario, Canada L9T 2X8, 64K required, disk or cassette $28.95 U.S., $38.95 CDN plus $2 S/H)

— Gabriel Weaver

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Menu Maker Gives Easy Access to Disk Files

By A. Buddy Hogan

Menu Maker is a machine language utility that places a Hi-Res, user-definable graphics screen, disk name and disk directory menu on disks. *Menu Maker* requires a 32K CoCo with either Disk BASIC 1.0 or 1.1 and at least one disk drive (it will support multiple drives). If you have a non-standard Disk Operating System such as ADOS, JDOS or Spectrum DOS, *Menu Maker* will not work as supplied. However, for $15 you may copy your DOS onto disk (the documentation explains how to do this), send it in and receive a copy of *Menu Maker* that is compatible. Or, if you are really industrious, you may order the commented source code for *Menu Maker* for $10 and make the modifications yourself.

Menu Maker is supplied on a non-protected disk and you are urged to make a backup before proceeding. This is particularly important when using this software because you must select between the two main programs on the disk; one for Disk BASIC 1.0 and the other for 1.1. You kill one and use the other.

When you `LOADM` the main program, you are presented with a high resolution screen that is divided into two sections. The top section is a graphics of a CoCo and the name, address and phone number of Saguaro Software. At the bottom of the top section is a flashing box in which the words DISK MENU MAKER have been designed. This box flashes between a regular and inverse screen (dark becomes light, light becomes dark). The bottom of the screen displays the names of up to 24 files stored on the disk. The names are in Hi-Res, and the name at the top has arrows on each side that replace the traditional cursor. Centered right above the filenames is the name of the disk (in this case, *Menu Maker Master Disk*).

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You may run any of the programs on the disk by using the up- and down-arrow keys to enclose the name of the file you want to run with the "cursor" and pressing ENTER. *Menu Maker* runs almost any BASIC or machine language file (it ran all the ones I tried, but the documentation says "almost").

The filenames are displayed in up to three columns of six names each, with only the filenames being displayed, not the extensions. You may also read filenames from another disk into the *Menu Maker* high resolution screen by exchanging disks and pressing the BREAK key. The names of the files on the new disk are shown where the previous filenames were.

So, what do you want with Saguaro's address on your disks? The whole idea of *Menu Maker* is to allow you to design your own menu screen(s) to jazz up your disks and gain easy access to each of the files on the disks. Alas, *Menu Maker* is not a graphics editor, so you have to supply your own design. The design may be created by any of the graphics editors for the CoCo (*CoCo Max*, *Graphicom*, *Master Design*, *Micro Painter*, etc.) capable of producing a standard binary screen file. If you want to see whether pictures created by your graphics utility are compatible with *Menu Maker*, type in the following program (from the *Menu Maker* documentation):

```
10 PCLEAR 4:PMODE 4,1:SCREEN 1,1
20 LOADM"FILENAME"
30 GOTO30
```

You will have to create a screen that occupies the same amount of space as the sample screen that is provided with *Menu Maker* (roughly half of the screen) because the bottom half is reserved for the name of the disk and the filenames. Or you can just ignore the bottom half since it won't be seen. I used a sample screen supplied with a graphics utility I was reviewing simultaneously, and modified it so it would fit on the top half of the screen. Next, I ran a BASIC program called *RECONFIG* that allows you to customize the *MENU* program. Using this program, you may replace the *MENU* display screen with a screen you have developed, i.e., enable/disable flashing, determine where the flashing will begin/end on the screen and set the rate at which the flashing will occur.

A BASIC program is provided to allow you to name any disks in your collection on which you want to place a copy of *MENU*. This program displays anything contained in Sector 1 of Track 17 and cautions that anything already there will be overwritten by the name that you choose for the disk. The delay for this warning is so brief, though, that you have to be a speed reader to catch it (just increase the time delay in Line 2 of *NAMEDISK* to 2000). It would also be nice if the program didn't end after you've named one disk. A user with several disks to name doesn't want to have to run the program to name each disk. You can fix this by editing out the `END` in Line 10 and replacing it with a `GOTO1`.

After you've merged your own screen into *MENU* and named your disks, you are ready to copy the new *MENU/BIN* program to your disks. From then on, when you put your disks in the drive, just type `LOADM"MENU"`, move the cursor to the file you want to run, press ENTER and that's all there is to it.

As a RAINBOW reviewer, I am encouraged to do exactly what a purchaser of the software would do if there is a problem — call the company. I couldn't get the *RECONFIG* program to let me change the point at which the flashing stops. I called Saguaro and learned they only distribute the software and any technical questions would have to be directed to the author. I called his number over an entire day and got nothing but a busy signal. So I can't tell you from experience whether you can modify the end of the flashing screen.

I know that you can modify the point at which the flashing is to begin. The manual says that the values for start and end of flashing must be entered as Hex numbers and that the screen goes from $0000 (0) to $17FF (6,143). The *RECONFIG* program says that valid inputs for the modifications are $0000 to $25FF (9,727). The flashing begins on the sample screen at $0900 (2,304) and ends at $0B80 (2,944), which is the end of the upper portion of the screen available to you for modification. If all of this is confusing you, it confused me also. Any attempt to change the end of the flashing resulted in no change being made, but a hangup of the program if the up arrow was pressed.

It would also be nice for the author to give the uninitiated a little help with Hex. In order to convert a decimal number to a hexadecimal number, type in "`PRINT HEX$(X)`" (where 'X' is a decimal number between 0 and 65,535). Valid decimals to convert to Hex for the start of flashing are 0 through 2944.

The documentation consists of five 8½ by 11-inch bright yellow pages. It does a good job of explaining how to use the features of the software, with the exception noted above related to the flashing screen option.

This would be an especially useful piece of software if the filename display was not limited to 24 entries. Typically, a person interested in a disk utility like *Menu Maker* would use it for disks that store a number of utility or other files. Rather than search through a directory racing by, users would enjoy the ease of implementing a program (already stored on each such disk) that places all of the names neatly in front of them and allows selecting the one wanted by merely moving the cursor around with the arrow keys. As is, you must either limit the number of files on these disks to 24, or use *Menu Maker* to see only the first 24 files on the disk.

(Saguaro Software, P.O. Box 1864, Telluride, CO 81435, disk $24.95 plus $1 S/H)

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Enjoyment for Board-Game Lovers with *Perpetulife*

Perpetulife is something like a cross between the games of "Checkers" and "Life." The objective is to have more live cells than your opponent, and play is on a grid resembling the board games. The number of living cells you have depends on mathematical relationships with neighboring cells (yours or your opponent's).

Without the right balance of cells around a particular cell, it will die. The perpetual creation and killing of individual cells allows much shifting of the tides during a game.

In order to win *Perpetulife*, you must figure out how to position your cells to kill off your opponent's cells. It requires a good understanding of how the process works. I never figured out a good way of winning. I think with time and patience, or a better understanding of the process than mine, you can enjoy *Perpetulife*.

The instructions for the game are clear and the tape loaded with no problems. In fact, when I got home from work my 9-year-old had loaded the game and tried it out. He was disappointed it wasn't a fantastic arcade-like game.

Perpetulife is written in a combination of BASIC and assembly language. The first time the program is run it loads in the assembler portion. It requires 16K and allows the option to play against human opponents or the CoCo. If you enjoy board games converted for the CoCo, *Perpetulife* will interest you.

(Tothian Software, P.O. Box 663, Rimersburg, PA 16248, requires 16K, cassette $19.95)

— A.R. Compton

Two-Liner Contest Winner . . .

Piano draws a piano keyboard on the screen. The keyboard ranges from middle C to high C. After running the program, press the number keys to play some music.

The listings:

```
5 GOSUB10:FORX=1TO255:PRINT@Y*32
+3,RIGHT$(STR$(X),LEN(STR$(X))-1
);:PRINT@Y*32+14,CHR$(X);:POKE10
24+Y*32+21,X:Y=Y+1:IFY=15THENPRI
NT@Y*32,;:INPUT"PRESS enter";E$:
GOSUB10:NEXTELSENEXT:END
10 CLS:Y=2:PRINT@6,"ASCII TABLE"
;:PRINT@32," DECIMAL     PRINT  P
OKE";:RETURN
```

Garry L. Shelton
Kannapolis, NC

(For this winning two-liner contest entry, the author has been sent copies of both *The Rainbow Book of Simulations* and its companion *The Rainbow Simulations Tape*.)

SIDE WISE OS9 Prints Wide Spreadsheets

My wife is an accountant and keeps the books for several clients on our CoCo. We have often spent many boring hours taping pages together. As a matter of fact, we believe that the spreadsheet was invented by tape manufacturing companies.

SIDE WISE OS9 makes this task unnecessary. I already owned *SIDE WISE* for Disk BASIC and was interested in the differences between these two different yet similar programs from the same author.

SIDE WISE OS9 is a utility program that literally turns each ASCII character 90 degrees sideways, thus allowing you to print the length of the page rather than the width. It does this by reading each ASCII character from a file and re-creating it turned 90 degrees as a bit-graphics picture. There are several advantages and disadvantages to this technique. The primary advantage is that the character set is totally independent of the printer's built-in font set and, therefore, can be modified to accommodate many needs. The main disadvantage is speed. Since each character is a separate picture, it must be printed in graphics mode.

I received *SIDE WISE OS9* on a disk that contained five modules, i.e., 1) *Setup*, 2) *Swise*, 3) *Setone*, 4) *Settwo* and 5) *Swparam*. The first two are program modules and must be copied into the current execution directory normally, */d0/cmds*. The next three are data modules and must be copied into the current data directory, normally */d0*. *Swise* and *Setup* are written in BASIC09 so the user must also have the *RunB* module in the execution directory.

Once the modules are in place, the user types `SETUP` and is greeted with the setup menu, which contains: 1) printer type, 2) default output device and 3) paper width.

The printer options include Radio Shack, Epson, C.Itoh, Okidata, and Gemini. The default output device would normally be */P* printer. Paper width can be either eight inch or 14 inch.

Once the setup is complete, all the user needs to do is enter `SWISE` at the command line and a menu appears giving several options, including: 1) filename, 2) output device, 3) column width, 4) maximum rows, 5) font, 6) print sidewise, 7) perform OS-9 command and 8) exit to OS-9.

The user must first take option one to select the filename to be printed. This filename may contain any pathnames necessary. If the rest of the displayed parameters are acceptable, the user then selects option six to print the sheet. The sheet may be printed as a background task by printing the sheet to another file, to be later `LIST`ed to the printer as a background task. This is done by changing the output device (option 2) to a filename. This offers the advantage of not tying up the computer with the printing job, which is somewhat lengthy. Menu option three toggles between eight inch and 14 inch paper widths. Option four is calculated by the program. Option five is either standard or condensed print. Option seven allows you to execute an OS-9 command without leaving *Swise*. Menu option eight leaves *Swise* and exits to OS-9.

After installing *SIDE WISE OS9* V. 1.0 onto my OS-9 V. 1.01 BASIC09 system disk and transferring a *DynaCalc* spreadsheet in ASCII, my first attempt to print it was a failure. Back to the instructions. Oops! Forgot to turn pagination off. The second try was successful. Out came my spreadsheet neatly printed sideways.

Several things must be done to the spreadsheet to print it with *SIDE WISE OS9*. First, you must set the printer width to 80 and turn off the pagination. You must also close the output path to the printer so that the sheet is printed to a file, thus converting it to ASCII. You must also consider the size of the spreadsheet. If it will have too many rows, a factor that must be calculated based on whether you are printing in condensed or regular print and what width paper you are using, you must break the sheet up into smaller sheets before printing it to a file.

SIDE WISE OS9 is very user friendly and anyone who is familiar with the OS-9 operating system would have no trouble using it.

The documentation supplied with the program, while brief, is complete and easy to follow, leading the user through both installation and use.

SIDE WISE OS9 is a handy utility to have if you have need of presentation-quality spreadsheets. Because of its slow printing speed (a sheet on my Epson at 600 Baud took approximately 10 minutes), it is not something you would use unless you really needed to. This is not really a program fault, but rather a characteristic of this type of program.

There are a few things that I would like to see done to the program. First, I would like the documentation on standard 8½-inch paper. The ones supplied were only printed four inches wide in tiny print that I found difficult to read without a magnifying lens. I would like to see the program supplied with a module to convert a spreadsheet file into the necessary number of files, thus freeing the user of this chore. Neither of these improvements would be very difficult and would increase user satisfaction enormously. I encountered one final problem. I was not able to change the Baud rate for printing. When I tried, using the OS-9 XMODE /P baud= command, the printing became erratic and printed garbage at any speed except 600 Baud. I also tried it on OS-9 V. 1.0 and got the same results. I must admit that I never print graphics on OS-9 and, therefore, I cannot say if the fault is with the program or with the bit-banger routine in OS-9 itself.

At the cost of $39.95, *SIDE WISE OS9* allows the user the option of printing nice-looking, wide spreadsheets. It is moderately easy to use and works well. I recommend it to anyone who needs this kind of utility.

(Derringer Software, Inc., P.O. Box 5300, Florence, SC 29502-5300, OS-9 and BASIC09 required, printer necessary, $39.95 plus $3 S/H)

— Larry Goldwasser

Hint . . .

Waiting for the Keystroke

If you want your BASIC program to wait for a keystroke, just type `EXEC 44539`. This performs the same function as `A$=INKEY$:IF A$="" THEN` (next line).

The computer waits for any key to be pressed before the program continues.

CoCo EPROM Programmer Has a Variety of Functions

In the July 1983 RAINBOW (Page 70), we did a review of the first generation of The Intronics EPROM Programmer. Recently RAINBOW received a new model from Spectrum Projects, Inc., that is an improvement over the older model, even though the older model worked fine.

First of all, who needs an EPROM programmer? Perhaps you have read all of the different articles on patching BASIC to make your disk drives step at six ms, or adding new commands. To make these changes permanent you must replace one of the ROMs inside your CoCo with an EPROM.

The only way to program an EPROM is with an EPROM programmer. At the same time, as was pointed out in the previous review, a CoCo with The Intronics EPROM Programmer is a more than adequate substitute for a commercial programmer. These commercial models run upwards of $1,000 and require personality modules for each different type of EPROM. This model is a bargain at $149.95.

A 16K non-Extended CoCo is all that is necessary. If you care to use the programmer with a disk system, you must have a Multi-Pak because the software is at the same address as your disk controller. Adequate instructions are given on how to relocate the software, but you still need a place to plug in both your disk controller and your programmer. The unit comes with a 10-page user's manual and a 90-day limited warranty.

The CoCo EPROM programmer is in a plastic case about twice the size of a normal ROM pack. A hole cut in the top of the case exposes the 28-pin heavy duty ZIF (zero insertion force) socket to hold the EPROM. One nice thing that separates the Intronic's unit from others I have seen is an on-board power supply — no batteries to string together to come up with the proper programming voltage. In fact, the programming voltage (12.5-21-25V) is programmable under software control. The unit normally plugs into your ROM port.

Software is on an EPROM inside the unit, so powering up your computer and typing `EXEC 49152` will boot the self-contained software. Functions include: 1) EPROM erased, 2) Program EPROM, 3) Verify EPROM, 4) Move EPROM to memory, 5) Slide memory, 6) Examine/change memory, 7) Fill buffer with FFs, 8) Return to BASIC, 9) Change buffer address and 0) Change Vpp.

The buffer for the programmer normally starts at $2000, but using menu function 9, it can be moved to anywhere in memory. This allows you to duplicate your ROMs without moving them.

The CoCo EPROM Programmer has a wide variety of EPROM characteristics already in the software. No personality modules are necessary. Following are the choices:

2516/2716	2K	x	8
2532	4K	x	8
2732	4K	x	8
2564	8K	x	8
2764	8K	x	8
25128	16K	x	8
27128	16K	x	8
68764/6	8K	x	8
2732A	4K	x	8
27256	32K	x	8
27512	64K	x	8
2508	1K	x	8
2578	1K	x	8
2758	1K	x	8
MK2764	8K	x	8

As most experimenters are aware, the 68766 is the replacement for the pre-Korean CoCo ROMs. You can tinker around changing things as much as you like with this device. One nice bonus in the manual explains the wiring necessary to use the less expensive 2764 EPROMs in place of 68766s.

One extra piece of software is included that is unique. A program named *BIRP* (BASIC in ROM pack) is included. This allows putting your favorite BASIC program in a ROM pack for automatic execution. You can even `LIST` protect the program if you wish.

I think the CoCo EPROM Programmer is the nicest and most functional unit of its type on the market. It's a little more expensive than some of the competitors, but I think it's worth the investment. I programmed a few EPROMs with the demo unit and it worked flawlessly.

(Spectrum Projects, Inc., P.O. Box 21272, 93-15 86th Drive, Woodhaven, NY, 11421, $149.95 plus $3 S/H)

— Dan Downard

Hint . . .

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Let CoCo do all the thinking on your next trip to the grocery store

The Computerized Shopping List

By Dennis H. Weide

Grocery shopping doesn't have to be such an unpleasant task anymore. *Shoplist* is a menu-driven program that allows you to enter dinner menus by number and print a shopping list. It requires 16K of RAM, Color BASIC, a printer and runs on disk or cassette systems.

To get started, key in the BASIC program as listed. If you have a 16K machine, delete all the remarks and unnecessary spaces. The `DATA` statements starting at Line 1550 are a partial listing of the menu we use at our house. I have reduced the menu by about 80 percent to simplify the sample printouts. You'll have to type in your own data so it's not necessary to enter lines 1550 to 2010. However, you may want to type in several of the lines just to see how the program handles the data and to ensure that your program works properly.

Dennis Weide is an avid computer hobbyist who teaches programming on the CoCo and IBM PC. He has written for all the major CoCo magazines, including many programs in RAINBOW. Dennis lives in Albuquerque, New Mexico.

Storing Program Data

Storing data is easy but requires an explanation. Refer to the program listing and Table 1, and follow these simple instructions when entering data elements. It's a good idea to use a separate program line for each meal so editing or adding elements is easier. Always precede section titles with a 'Y' and a comma (,) as in Line 1550. The 'Y' indicates that the next data element is a section title and will be printed in large font. In this case, the section title is "Main Course Dinners."

Always precede meal titles with an 'X' and a comma (,) as in Line 1560. The 'X' indicates that the next element is a meal title and will also be printed in large font. In Line 1560, the menu title is "Deep Dish Pasta."

To enter the meal ingredients, enter the amount of the item first, followed by a comma and the name of the ingredient. In Line 1560, Deep Dish Pasta requires one jar of spaghetti sauce, one-half pound of ground beef, one bell pepper, etc. To end the list of ingredients, use double commas (,,). The program uses double commas to determine the end of the `DATA` statement.

A Sample Statement

Let's try a sample statement before you enter your own data. We'll enter the data for a hamburger dinner. Here's a list of ingredients we'll need.

1 pound ground beef
4 fresh potatoes
1 fresh onion
sweet relish
catsup
mustard
1 tomato

Now, here's how to enter this data in a statement.

```
155 DATA X,HAMBURGER DINNER,
  1,LB(S)
GR.BEEF,4,POTATO(S),1,ONION
  (S),0,SWEET
RELISH,0,CATSUP,0,MUSTARD,1,
  TOMATO(S),,
```

The (S) is used to make plurals easier and can be omitted. Also, to save memory, you can abbreviate as much or

Table 1

Data Element Requirements

`DATA X,`	Indicates meal title. Precede all meal titles with 'X', as in lines 1560, 1570, etc.
`DATA Y,`	Indicates section titles. Precede all section titles with 'Y', as in lines 1550, 1760, etc.
Double commas	Indicates end of ingredients for specified meal. All meal lines should end with (,,). Do not put a space between commas.
`DATA END`	Place the word END at the end of selectable items. Any data after this word are treated as miscellaneous items. See Line 1880.
`DATA LAST`	Place the word LAST at the end of dinner section of `DATA` statements. See Line 1710.
`DATA STOP`	Place the word STOP at the end of complete data listing. If this word is omitted, you will get an OD Error when you run the program.

as little as desired. Using the abbreviation "GR." instead of the whole word "ground" saves three bytes. Notice that sweet relish, catsup and mustard are all preceded by a zero (0). These items require less than an entire jar, so check your supply to see if you need them. Otherwise, cross them off the list.

The program requires three other special words to function properly; they are shown in Table 1. The word LAST is used to indicate the last of the dinner `DATA` statements. In my program, Line 1710 does this. Any `DATA` statements after Line 1710 can't be chosen automatically.

The word END is used to indicate the end of the selectable menu items (see Line 1880). Any `DATA` statements after this element are treated as miscellaneous items. All miscellaneous items can be entered under titles in any manner you wish. Use an asterisk (*) in titles as shown in Line 1890 if you want these titles to be printed in large font. Any miscellaneous items that also appear in the first part of the program data are compared before being printed.

The last data element in the program must be STOP (see Line 2010). This element tells the program not to look for more data. If you follow the instructions, you can add as many titles and selections as needed.

Using Special Codes

For those with a Line Printer VII, this program works as listed. For those who have a different printer, I have used control codes for all printer functions so you can change them as needed. Lines 230 and 240 set the codes for the LP VII. Use Table 2 to determine the function of each code. If you have a printer that automatically returns to small font at the end of a printed line (such as Epson MX-80), delete PO$ from Line 230. It isn't necessary to delete it anywhere else in the program.

You can also add the speed-up `POKE`s to the program to decrease the execution time. However, if speed is not too important or if you aren't using a disk, I don't recommend the high-speed `POKE` because it causes too much internal heat to build up.

Now Let's Try the Program

After you have keyed in the listing and saved a copy to tape or disk, run the program. A program menu appears and you'll be prompted to enter one of five choices:

1. Auto dinner selection
2. Enter your selections
3. List menu w/o ingredients
4. List menu w/ ingredients
5. Print shopping list

Entering a '3' produces a printout similar to Sample Printout 1. It is a list of all menu items without ingredients. This list is used to make menu selections when running the program. Now let's discuss the remaining options.

Auto Dinner Selection

If you choose number '1' on the menu, the program prompts you to enter the number of dinners you want selected. This is a great option if your family can't agree on what to have for dinner. After entering the number of dinners, you're free to leave the computer for a while and do something else. The computer randomly chooses the dinners, prints a complete menu with the ingredients for each dinner, then returns to the program menu.

The auto option chooses the dinners from the dinner section of the program only. Originally, I had the program automatically select dinners, salads and desserts. This created problems when the program chose hot dogs and french fries for dinner, shrimp cocktail for the salad and chocolate mousse for dessert — these selections somehow didn't seem to go together. You can let the computer select your dinners, but you'll have to select your own salads and desserts when it finishes.

Table 2

Printer Control Codes

PO$	ASCII Code 30 — Sets the printer to normal font (standard print size).
P1$	ASCII Code 31 — Sets the printer to large font (double width print).
RT$	ASCII Code 26 — Carriage return without line feed.
L1$	ASCII Code 10 — Carriage return with line feed.
L2$	ASCII Codes 2 and 10 — Cause double line feed.
L3$	ASCII Codes 3 and 10 — Cause triple line feed.

(L2$ and L3$ can be replaced with ASCII Code 12 if your printer allows form feeds.)

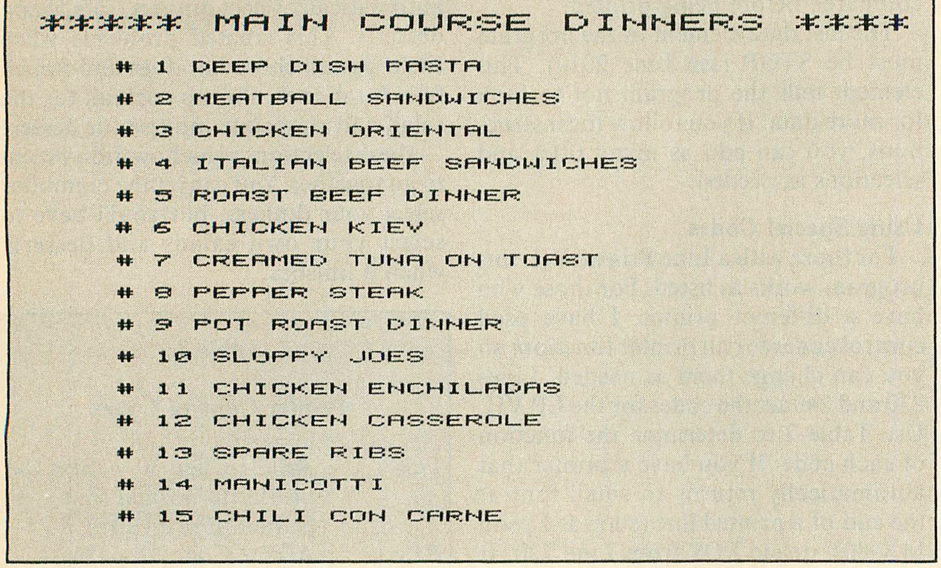
Entering your Selections

The second choice on the program menu lets you select your own dinners. This is the option you will most likely use. You can use it before, after or without the auto dinner selection. The program prompts you for the number of entries you wish to make. A `FOR/NEXT` loop is used to assign the entries to variable names. You enter the number of the dinner, salad, dessert or other item; not the item name. This is the number shown in Sample Printout 1. The program prints a list of your selections with all the required ingredients, then returns to the program menu.

Listing the Menu

Entering a '3' or '4' from the program menu lists each dinner, salad, dessert or other menu item with its assigned number. For the purpose of this article, I'll refer to all menu items as dinners. Option 3 (Sample Printout 1) lists the menu without the ingredients, while Option 4 (Sample Printout 2) lists all the ingredients below the dinner. These lists are used to determine the dinner

Sample Printout 1



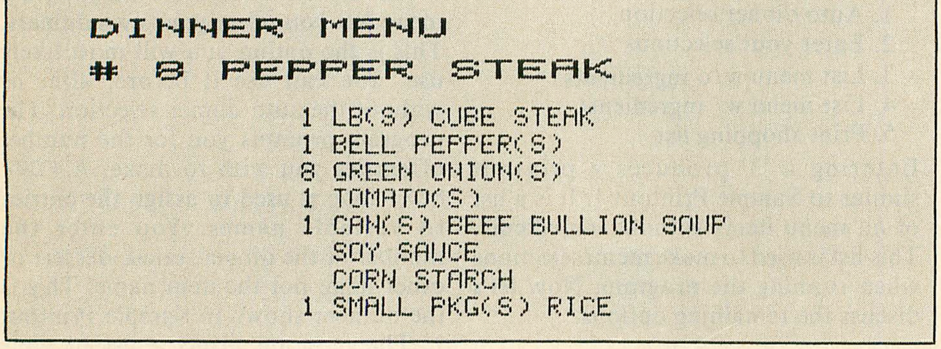
```
***** MAIN COURSE DINNERS ****

    # 1 DEEP DISH PASTA
    # 2 MEATBALL SANDWICHES
    # 3 CHICKEN ORIENTAL
    # 4 ITALIAN BEEF SANDWICHES
    # 5 ROAST BEEF DINNER
    # 6 CHICKEN KIEV
    # 7 CREAMED TUNA ON TOAST
    # 8 PEPPER STEAK
    # 9 POT ROAST DINNER
    # 10 SLOPPY JOES
    # 11 CHICKEN ENCHILADAS
    # 12 CHICKEN CASSEROLE
    # 13 SPARE RIBS
    # 14 MANICOTTI
    # 15 CHILI CON CARNE
```

number mentioned earlier and to verify that the dinner ingredients are correct.

Printing the Shopping List

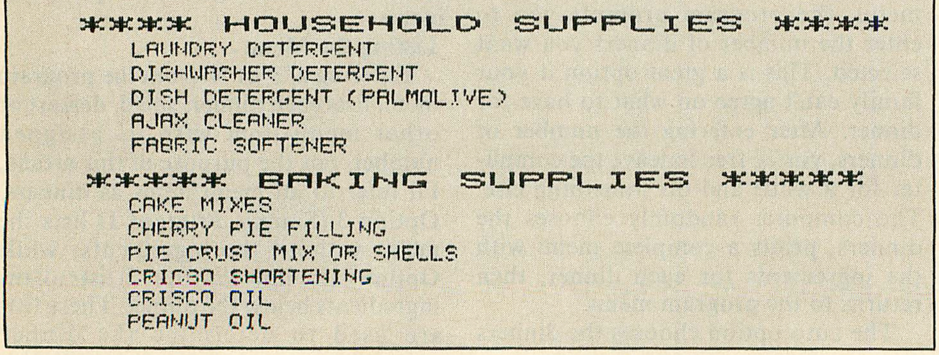
The last choice on the program menu prints the entire shopping list (Sample Printout 3). Before printing the list, the program scans it and totals identical ingredients so they will only be printed once. This takes a little while, so you can go find other things to do. If you wish, you can change Line 940 to read: `940 GOTO 1280`.

Sample Printout 2



```
DINNER MENU
# 8 PEPPER STEAK

          1 LB(S) CUBE STEAK
          1 BELL PEPPER(S)
          8 GREEN ONION(S)
          1 TOMATO(S)
          1 CAN(S) BEEF BULLION SOUP
            SOY SAUCE
            CORN STARCH
          1 SMALL PKG(S) RICE
```

Sample Printout 3



```
**** HOUSEHOLD SUPPLIES ****
  LAUNDRY DETERGENT
  DISHWASHER DETERGENT
  DISH DETERGENT (PALMOLIVE)
  AJAX CLEANER
  FABRIC SOFTENER
***** BAKING SUPPLIES *****
  CAKE MIXES
  CHERRY PIE FILLING
  PIE CRUST MIX OR SHELLS
  CRICSO SHORTENING
  CRISCO OIL
  PEANUT OIL
```

The shopping list is automatically printed after completing your selections and the computer has totaled them. This method saves a lot of time.

The shopping list is printed in two sections. The first section is the list of ingredients for the dinners you or the computer have chosen. Duplicate items are only printed once, but the total is correct for the amount required for all dinners. The second section of the shopping list is all the miscellaneous items that will be printed every week. You must compare this section of the list with what you have on hand and cross off anything that is not needed.

If you print a shopping list and wish to add to it, choose '1' or '2' when the program menu appears. Make your new selections and print a new shopping list. You will have a complete list with the new dinner ingredients listed at the end of the list.

Note that the first part of the shopping list contains only the items required to prepare the dinners, salads, desserts or other selections chosen. The last part contains all items you want printed every week. If you wish to delete this option, don't enter any data using the `DATA Y` option. The program will then only print the selected items.

Memory Requirements

The amount of free memory after the program is loaded determines how much data the program can store. To use all the memory available, clear the graphics memory pages. For disk users, type the following:

`POKE 25,14:POKE 3584,0:NEW` ENTER

For non-disk users, type:

`POKE 25,6:NEW` ENTER

After deleting all remarks, unnecessary spaces and `DATA` statements, a 16K disk system has about 9,865 bytes of free memory and a 32K disk system has about 26,249 free bytes available. A non-disk system has 2K bytes more free memory because the disk operating system (DOS) uses 2K. You can change the `DIM` statements in Line 270 to reflect what you need. To do this, type:

`RUN 5000` ENTER

This program line counts the number of valid data elements and prints the dimension size on the screen.

That's All, Folks!

Shoplist is not a recipe program, but a shopping-list program. It can help plan your meals and grocery budget. When entering data elements, figure the amount of ingredients normally used to feed your family. We have a family of four, so each dinner is listed with the ingredients required to feed four people. If you're planning to have guests for dinner one evening, enter the dinner menu two or three times, as necessary, to increase the size of the dinner.

After you've used this program for a week or two, it will make your grocery shopping easier — you won't have to return to the store for things forgotten! That alone should be worth the time and effort required to type it in. ☐

300	10		
480	1	1620	77
700	147	1680	195
920	75	1780	232
1120	10	1860	21
1320	120	1940	80
1530	0	END	104

The listing: SHOPLIST

```
100 '     MENU & SHOPPING LIST

110 '     BY DENNIS WEIDE
120 '     COPYRIGHT (1985)
130 '
140 '
150 CLS:PRINT@34,"DINNER MENU &
SHOPPING LIST"
160 PRINT@104,"BY DENNIS WEIDE"
170 PRINT@169,"COPYRIGHT 1985"
180 '
190 '
200 '     CONTROL CODES
210 '
220 '
230 P0$=CHR$(30):P1$=CHR$(31):RT
$=CHR$(26)
240 L1$=CHR$(10):L2$=STRING$(2,1
0):L3$=STRING$(3,10)
250 READ B$:IF B$="X" THEN DN=DN
+1
260 IF B$="LAST"THEN 270 ELSE 25
0
270 DIM MU$(7):DIM IT$(210):DIM
IT(210):DIM RD(7)
280 '
290 '
300 '     PROGRAM MENU
310 '
320 '
330 Q1=0:CLS:PRINT:PRINT
340 PRINTTAB(2)"DINNER MENU & SH
OPPING LIST"
350 PRINTTAB(8)"MAIN PROGRAM MEN
U"
360 PRINT:PRINTTAB(2)"1.AUTO DIN
NER SELECTION"
370 PRINTTAB(2)"2.ENTER YOUR SEL
ECTION"
380 PRINTTAB(2)"3.LIST MENU W/O
INGREDIENTS"
390 PRINTTAB(2)"4.LIST MENU W/IN
GREDIENTS"
400 PRINTTAB(2)"5.PRINT SHOPPING
 LIST"
410 PRINT:PRINT:Z=0
420 INPUT"    ENTER ONE OF THE AB
```

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```
OVE";M
421 F1=0:RESTORE
422 IF M<1 OR M>5 THEN 330
423 IF P9=0 AND M=5 THEN 330
424 IF M<3 THEN P9=1
430 ON M GOTO 500,660,1100,1100,
1280
440 GOTO 330
450 '
460 '
470 '    AUTO DINNER SELECTION
480 '
490 '
500 CLS:RESTORE:PRINT:PRINTTAB(5
)"AUTO DINNER SELECTION"
510 PRINT:PRINT
520 INPUT"  ENTER NUMBER OF DINN
ERS";ND
530 PRINT:PRINTTAB(7)"ONE MOMENT
 PLEASE!"
540 PRINTTAB(3)"THE COMPUTER IS
SELECTING"
550 PRINTTAB(10)"YOUR DINNERS."
560 FOR X=1 TO ND
570 RD(X)=RND(DN)
580 FOR Y=1 TO ND:IF Y=X THEN 60
0
590 IF RD(X)=RD(Y) THEN RD(X)=RN
D(DN):GOTO 580
600 NEXT Y,X:GOTO 730
610 '
620 '
630 '    SELECT YOUR DINNERS
640 '
650 '
660 CLS:PRINT:PRINTTAB(5)"ENTER
YOUR SELECTIONS"
670 PRINT:PRINT
680 INPUT"  ENTER NUMBER OF SELE
CTIONS";ND
690 FOR X=1 TO ND
700 PRINTTAB(7)"ENTER SELECTION
#";:INPUT RD(X)
710 NEXT X
720 CLS:PRINT:PRINTTAB(7)"ONE MO
MENT PLEASE!"
730 FOR X=1 TO ND:RESTORE:Z=0
740 READ B$:IF B$="X" THEN Z=Z+1
750 IF B$="END" THEN 780
760 IF RD(X)=Z THEN 770 ELSE 740
770 READ A$:MU$(X)=A$
780 NEXT X
790 '
800 '
810 '    HARDCOPY OF DINNER SEL
ECTION
820 '
830 '
```

```
840 CLS:PRINT:PRINTTAB(4)"HERE'S
YOUR PRINTER COPY"
850 PRINT#-2,P1$;L1$:FOR RR=1 TO
3
860 PRINT#-2,"DINNER MENU";RT$;:
NEXT RR
870 FOR X=1 TO ND:RESTORE:Z=0
880 READ A$:IF A$="X" THEN Z=Z+1
890 IF A$=MU$(X) THEN 900 ELSE 9
30
900 PRINT#-2,L2$;P1$:FOR RR=1 TO
3
910 PRINT#-2,"#"Z;MU$(X);RT$;
920 NEXT RR:PRINT#-2,P0$;L1$:GOS
UB 1000
930 IF A$="END" THEN NEXT X ELSE
 880
940 GOTO 330
950 '
960 '
970 '    LIST INGREDIENTS ON SE
LECTION
980 '
990 '
1000 READ B1$,B2$:IF B1$="" THEN
 RETURN
1010 F1=F1+1:IT(F1)=VAL(B1$):IT$
(F1)=B2$
1020 IF VAL(B1$)>0 THEN 1040
1030 PRINT#-2,TAB(12);B2$:GOTO 1
000
1040 PRINT#-2,TAB(10);B1$" "B2$:
GOTO 1000
1050 '
1060 '
1070 '    LIST SELECTIONS
1080 '
1090 '
1100 CLS:RESTORE:PRINT:PRINTTAB(
6)"PRINTER COPY OF DATA"
1110 READ A$:IF A$="X" THEN Q1=Q
1+1:GOTO 1170
1120 IF A$="Y" THEN 1130 ELSE 11
60
1130 READ B$:PRINT#-2,P1$;L3$
1140 FOR RR=1 TO 3:PRINT#-2,B$;R
T$;:NEXT RR
1150 PRINT#-2,P0$;L1$:GOTO 1110
1160 IF A$="END" THEN 330 ELSE 1
110
1170 READ B$:PRINT#-2,P1$;"#";Q1
;B$;P0$;L1$
1180 IF M=4 THEN READ B$,C$ ELSE
 1110
1190 IF C$="" THEN PRINT#-2,L2$:
GOTO 1110
1200 IF VAL(B$)>0 THEN 1210 ELSE
 1220
```

```
1210 PRINT#-2,TAB(10)B$" "C$:GOT
O 1180
1220 PRINT#-2,TAB(12)C$:GOTO 118
0
1230 '
1240 '
1250 '     PRINT SHOPPING LIST
1260 '
1270 '
1280 CLS:PRINT:PRINTTAB(1)"HERE
COMES YOUR SHOPPING LIST"
1290 F1=F1+1:READ A$:IF A$="STOP
" THEN 1310
1300 IT$(F1)=A$:GOTO 1290
1310 FOR X=1 TO F1
1320 FOR Y=1 TO F1
1330 IF Y=X THEN 1350
1340 IF IT$(Y)=IT$(X) THEN IT(X)
=IT(X)+IT(Y):IT(Y)=0:IT$(Y)=""
1350 NEXT Y,X
1360 PRINT#-2,P1$;L3$;L3$:FOR RR
=1 TO 3
1370 PRINT#-2,"SHOPPING LIST";RT
$;:NEXT RR
1380 PRINT#-2,P0$;L2$
1390 FOR X=1 TO F1
1400 IF LEFT$(IT$(X),1)="*" THEN
 1460
1410 IF IT$(X)>"" THEN 1420 ELSE
 1490
1420 IF IT(X)>0 THEN PRINT#-2,IT
(X);IT$(X)
1430 IF IT$(X)="Y" THEN 1490
1440 IF IT(X)=<0 THEN PRINT#-2,T
AB(3);IT$(X)
1450 GOTO 1490
1460 PRINT#-2,P1$:FOR RR=1 TO 3
1470 PRINT#-2,IT$(X);RT$;:NEXT R
R
1480 PRINT#-2,P0$
1490 NEXT X:GOTO 330
1500 '
1510 '
1520 '     RECIPE DATA
1530 '
1540 '
1550 DATA Y,********* MAIN COURS
E DINNERS ********
1560 DATA X,DEEP DISH PASTA,1,JA
R(S) SPAGHETTI SAUCE,.5,LB(S) GR
. BEEF,1,BELL PEPPER(S),1,ONION(
S),1,JAR(S) MUSHROOMS,1,PKG(S) E
LBOW MACARONI,8,OZ.MOZZERELLA CH
EESE,,
1570 DATA X,MEATBALL SANDWICHES,
1,JAR(S) PREGO SAUCE W/MUSHROOMS
,1,LB(S) GR. BEEF,8,OZ. MOZZEREL
LA CHEESE,1,PKG(S) STEAK BUNS,,
1580 DATA X,CHICKEN ORIENTAL,3,B
ONED CHICKEN BREASTS,2,CAN(S) OR
IENTAL VEGETABLES,2,CHICKEN BULL
ION CUBE(S),0,SOY SAUCE,0,CORN S
TARCH,1,BELL PEPPER(S),1,SMALL P
KG(S) RICE,,
1590 DATA X,ITALIAN BEEF SANDWIC
HES,1,LEFTOVER BEEF ROAST,1,BELL
 PEPPER(S),1,BEEF BULLION CUBE(S
),1,TSP(S) ITALIAN SEASONING,1,P
KG(S) STEAK BUNS,,
1600 DATA X,ROAST BEEF DINNER,4,
LB(S) ROAST BEEF,4,POTATO(S),2,P
KG(S) FRESH/FROZEN VEGETABLES,,
1610 DATA X,CHICKEN KIEV,8,BONED
 CHICKEN BREASTS,1,PKG(S) DRIED
BREAD CRUMBS,1,EGG(S),0,FLOUR,3,
GREEN ONION(S),0,CHIVES,0,PARSLE
Y,0,BUTTER,,
1620 DATA X,CREAMED TUNA ON TOAS
T,2,CAN(S) TUNA,0,MILK,0,FLOUR,0
,SLICED BREAD,1,PKG(S) FROZEN PE
AS,0,SALT,0,BLACK PEPPER,,
1630 DATA X,PEPPER STEAK,1,LB(S)
 CUBE STEAK,1,BELL PEPPER(S),8,G
REEN ONION(S),1,TOMATO(S),1,CAN(
S) BEEF BULLION SOUP,0,SOY SAUCE
,0,CORN STARCH,1,SMALL PKG(S) RI
CE,,
1640 DATA X,POT ROAST DINNER,4,L
B(S) CHUCK ROAST,4,POTATO(S),8,C
ARROT(S),2,ONION(S),,
1650 DATA X,SLOPPY JOES,1,PKG(S)
 SLOPPY JOE MIX,1,LB(S) GR. BEEF
,1,PKG(S) HAMBURGER BUNS,1,CAN(S
) TOMATO PASTE,,
1660 DATA X,CHICKEN ENCHILADAS,3
,BONED CHICKEN BREASTS,1,PKG(S)
CORN TORTILLAS,1,ONION(S),8,OZ.
COLBY CHEDDAR CHEESE,1,PKG(S) FR
OZEN GREEN CHILI,2,CAN(S) CREAM
OF CHICKEN SOUP,,
1670 DATA X,CHICKEN CASSEROLE,8,
BONED CHICKEN BREASTS,1,CAN(S) C
REAM OF CHICKEN SOUP,1,BELL PEPP
ER(S),1,ONION(S),0,WHITE COOKING
 WINE,,
1680 DATA X,SPARE RIBS,4,LB(S) P
ORK SPARERIBS,1,JAR(S) BARBEQUE
SAUCE,2,FRESH/FROZEN VEGETABLES,
,
1690 DATA X,MANICOTTI,1,LRGE JAR
(S) SPAGHETTI SAUCE,8,OZ. RICOTT
A CHEESE,8,OZ. MOZZERELLA CHEESE
,1/2,LB(S) GR. BEEF,0,PARSLEY,1,
PKG(S) MANICOTTI NOODLES,0,SALT,
0,BLACK PEPPER,,
1700 DATA X,CHILI CON CARNE,1,LB
(S) GR. BEEF,2,CAN(S) CHILI BEAN
S,1,CAN(S) TOMATO SOUP,1,BELL PE
```

```
PPER(S),0,CELERY,0,RED CHILI POW
DER,0,SALT,,
1710 DATA LAST
1720 DATA Y,***** BREAKFAST & LU
NCH *****
1730 DATA X,CEREAL BREAKFAST,1,B
OX(S) CEREAL,0,MILK,0,SUGAR,0,BR
EAD,,
1740 DATA X,EGGS & BACON,8,EGG(S
),1,LB(S) BACON,8,SLICE(S) BREAD
,,
1750 DATA X,FRENCH TOAST,8,SLICE
(S) BREAD,1,LB(S) BACON,0,MILK,3
,EGG(S),0,CINNAMON,0,SUGAR,,
1760 DATA Y,********* SALADS ***
******
1770 DATA X,STUFFED TOMATOES,6,T
OMATO(S),1,CAN(S) TUNA,0,MAYONNA
ISE,2,CELERY,0,SWEET RELISH,,
1780 DATA X,TUNA SALAD,1,CAN(S)
TUNA,1,ONION(S),0,SWEET RELISH,0
,MAYONNAISE,0,PARSLEY,1,PKG(S) E
LBOW MACARONI,,
1790 DATA X,CHICKEN SALAD,1,CAN(
S) CHICKEN,1,ONION(S),0,SWEET RE
LISH,0,MAYONNAISE,2,CELERY,1,PKG
(S) ELBOW MACARONI,,
1800 DATA X,POTATO SALAD,4,POTAT
O(S),0,SWEET RELISH,1,ONION(S),2
,CELERY,4,GREEN ONION(S),0,OLIVE
S,0,MAYONNAISE,0,MUSTARD,,
1810 DATA X,CARROT & RAISIN SALA
D,8,CARROT(S),1,SMALL PKG(S) RAI
SINS,0,MAYONNAISE,0,SUGAR,,
1820 DATA X,SHRIMP COCKTAIL,16,F
RESH SHRIMP,0,CATSUP,0,HORSERADI
SH,0,WORCHESTERSHIRE SAUCE,,
1830 DATA Y,********* DESSERTS *
*******
1840 DATA X,BREAD PUDDING,6,SLIC
E(S) BREAD,4,EGGS,0,MILK,0,SUGAR
,0,VANILLA,0,SALT,1,SMALL PKG(S)
 RAISINS,0,CINNAMON,0,NUTMEG,,
1850 DATA X,APPLE CRISP,1,CAN(S)
 APPLES IN WATER,0,FLOUR,0,BROWN
 SUGAR,0,CINNAMON,0,NUTMEG,0,SAL
T,0,BUTTER,,
1860 DATA X,WATERMELON FRUIT BAS
KET,1,WATERMELON(S),1,HONEYDEW M
ELON(S),1,CANTALOPE(S),1,PINEAPP
LE(S),2,PINT(S) STRAWBERRIES,1,L
B(S) GREEN GRAPES,,
1870 DATA X,TRIFLE,1,PKG(S) VANI
LLA PUDDING/PIE FILLING,1,PKG(S)
 JELLY ROLL,1,PINT(S) WHIPPING C
REAM,,
1880 DATA END
1890 DATA Y,***** BATHROOM ITEMS
 *****,BATH SOAP,TOOTHPASTE (CRE
ST),HAIR SPRAY,SPRAY DEODORANT,S
TICK DEODORANT,BATHROOM TISSUE (
TOILET PAPER)
1900 DATA Y,***** HOUSEHOLD SUPP
LIES *****,LAUNDRY DETERGENT,DIS
HWASHER DETERGENT,DISH DETERGENT
 (PALMOLIVE),AJAX CLEANER,FABRIC
 SOFTENER
1910 DATA Y,***** KITCHEN SUPPLI
ES *****,GARBAGE BAGS,ALUMINUM F
OIL,HANDI-WRAP,WAXED PAPER,ZIP-L
OCK SANDWICH BAGS,PAPER TOWELS
1920 DATA Y,***** DRINKS *****,S
OFT DRINKS,MILK,FROZEN JUICES (O
RANGE),HI-C SOFT DRINKS,CAPRI SU
N SOFT DRINKS,COFFEE (FOLGER'S D
RIP)
1930 DATA Y,***** SNACKS *****,P
OTATO CHIPS,ICE CREAM,POPCYCLES,
POPCORN (CRACKER JACK),HOSTESS C
UPCAKES,LITTLE DEBBIE CUPCAKES
1940 DATA Y,***** SPICES *****,V
ANILLA EXTRACT,MAPLEINE FLAVORIN
G,POWDERED SUGAR,SUGAR,FLOUR,SAL
T,BLACK PEPPER,GARLIC SALT
1950 DATA Y,***** BAKING SUPPLIE
S *****,CAKE MIXES,CHERRY PIE FI
LLING,PIE CRUST MIX OR SHELLS,CR
ICSO SHORTENING,CRISCO OIL,PEANU
T OIL
1960 DATA Y,***** RELISHES & CHE
ESES *****,SWISS CHEESE,CATSUP,M
USTARD,PICKLES,VELVEETA CHEESE,A
MERICAN CHEESE,JALAPENO CHEESE,F
ROZEN GREEN CHILI,COTTAGE CHEESE
1970 DATA Y,***** PET SUPPLIES *
****,DOG FOOD (CANNED),DOG FOOD
(DRY),CAT FOOD (DRY),CAT LITTER,
 DOG TREATS
1980 DATA Y,***** BREAKFAST FOOD
S *****,MUFFIN MIX,FROZEN WAFFLE
S,POPTARTS,WHEATIES CEREAL,FRUIT
 & FIBER CEREAL,LUCKY CHARMS CER
EAL,CHEERIOS CEREAL,EGG(S)
1990 DATA Y,***** MISC FOOD ITEM
S *****,CANNED FRUIT,MARACHINO C
HERRIES,COOKIES,CUP-A-SOUP,FRUIT
 ROLL,JELLO,LUNCHEON MEATS,PEANU
T BUTTER,JELLY,BUTTER,WHITE BREA
D,RYE BREAD
2000 DATA Y,***** FRESH FRUITS *
****,BANANAS,APPLES,ORANGES,PEAC
HES,PEARS
2010 DATA STOP
5000 READ A$:IF LEFT$(A$,1)="*"
OR A$="" OR A$=" " OR A$="X" OR
A$="Y" THEN 5000 ELSE X=X+1:IF A
$="LAST" THEN PRINT X/2+1 ELSE 5
000
```

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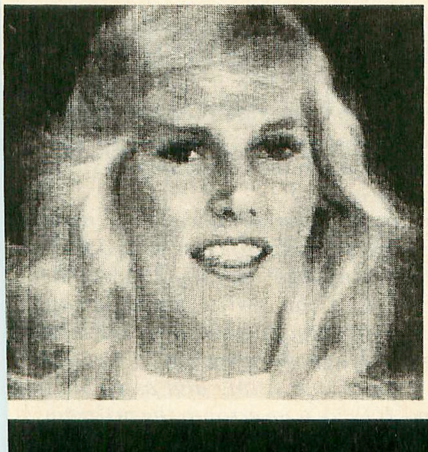
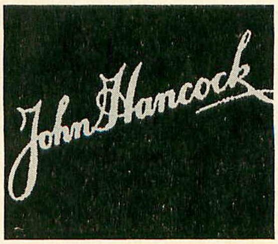


Printout

Screen



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RAINBOWTECH

DOWNLOADS

Deciphering the Mystery of the DOS Command

By Dan Downard
Rainbow Technical Editor

• *I recently bought a disk game from Radio Shack. In the loading instructions it said, "If you have Disk* BASIC *Version 1.1 (or greater), type:* DOS *and* ENTER.*" I looked through the book that came with the disk drive, but there was no mention of the* DOS *command. What I want to know is what the command does, and how can I use it in my programs?*

Tim Jones
Clinton, LA

Tim, the DOS command included in Disk BASIC 1.1 reads track 34 of the diskette in Drive 0. It assumes it is a machine language program that boots OS-9, but we can fool it to automatically execute any program we desire. An excellent article was written by Roger Schrag, entitled "A Special Use for the DOS Command." If you can find a copy of the November 1984 RAINBOW, the article should be quite helpful, but we'll reprint the program for your information.

```
 1 CLEAR 1000:CLS
 2 PRINT"AUTO START ON 'DOS'"
 3 PRINT"==================="
 4 PRINT
 5 PRINT"ENTER ANY COMMAND THAT"
 6 PRINT"YOU WOULD LIKE TO BE"
 7 PRINT"EXECUTED UPON TYPING"
 8 PRINT"IN 'DOS':"
 9 LINEINPUT B$
10 B$=B$+STRING$(255-LEN(B$),0)
11 FOR X=1 TO 64:READ N$
12 N=VAL("&H"+N$)
13 A$=A$+CHR$(N):CK=CK+N:NEXT
14 IF CK<>5775 THEN 39
15 A$=A$+STRING$(191,0)
16 PRINT"INSERT TARGET DISK AND"
17 LINEINPUT"PRESS ENTER ";N$
18 DSKI$ 0,17,2,C$,D$
19 N$=MID$(C$,67,1)
20 IF N$<>CHR$(255) THEN 43
21 E$=STRING$(66,201)+CHR$(255)
22 F$=STRING$(128,255)
23 DSKO$ 0,17,2,E$,F$
24 OPEN"D",1,"DOS BOOT"
25 PRINT#1,A$;CHR$(0);:PUT#1,1
26 PRINT#1,B$;CHR$(0);:PUT#1,2
27 CLOSE:MID$(C$,67)=CHR$(201)
28 DSKO$ 0,17,2,C$,D$
29 PRINT"FUNCTION COMPLETE"
30 END
31 DATA 4F,53,00,00,CE,01,6A,37
32 DATA 12,B7,26,3C,BF,26,3D,8E
33 DATA 26,1D,BF,01,6B,DC,8A,FD
34 DATA 26,00,7E,AC,7C,0F,70,AF
35 DATA E4,BE,26,3F,A6,80,BF,26
36 DATA 3F,4D,26,0E,B6,26,3C,BE
37 DATA 26,3D,B7,01,6A,BF,01,6B
38 DATA 86,0D,35,90,00,00,00,27
39 PRINT"CHECKSUM ERROR --"
40 PRINT"YOU HAVE ENTERED A"
41 PRINT"DATA LINE INCORRECTLY"
42 END
43 PRINT"THE REQUIRED PORTION"
44 PRINT"OF THE DISK IS BEING"
45 PRINT"USED BY A PROGRAM"
46 PRINT"ALREADY ON THE DISK"
47 END
```

Dan Downard is an electrical engineer and has been involved in electronics for 25 years through ham radio (K4KWT). His interest in computers began about six years ago and he has built several 68XX systems.

Boot won't Boot

• *I recently purchased Version 01.00.00 of the OS-9 operating system and am very interested in the assembler contained within the System disk. My system works fine with the exception of the assembler on the* DEFS *file. I cannot boot the assembler. I followed the instructions given in the OS-9 Program Development manual exactly (and have tried many other tactics also, but I keep getting ERROR: CAN'T OPEN).*

Andy Ellinor
Odessa, FL

Andy, I think you are trying to assemble a file that is already in your directory. You invoke the assembler by having the source file in the working directory. The assembled binary file is then written to the execution directory (normally the CMDS directory). If the name of your source file is *PROGRAM* and you want the assembled file to be called *BINARY*, use the following command:

OS9:ASM PROGRAM #16K O=/D0/CMDS/BINARY >/P

The #16K refers to the amount of memory used for the symbol table. The >/P sends a listing to your printer.

Looking for the Culprit

• *I have a problem with my 'F' version CoCo. When I try to* CSAVE "filename",A *it sounds like it just writes the beginning and the end of the file, and the computer skips all the data in between. I have Color* BASIC *1.1, Extended* BASIC *1.0 and Disk* BASIC *1.1.*

This quirk doesn't bother me as much while programming in BASIC *as it does in assembly language with my* EDTASM+ *ROM Pak. I can't write an unfinished source code onto tape; when typing in an assembly language program, I have to type it all in one sitting and assemble it to tape. If there is an error in the program,* *I can't correct it. If the program is very large (like 16K), I usually get discouraged and decide not to waste a lot of time in order to type the whole program in again.*

Is the problem in my ROM? If it is, which one and where can I buy a replacement? If the problem is not in my ROM, please tell me where the problem is and how I can fix it.

Mike Laster
Cedar Hill, MO

It sounds like you have tape recorder or relay problems, Mike. When ASCII data is encountered it is necessary to turn the tape recorder motor off and on between data blocks. If your cassette relay and tape recorder are working properly, you can usually see (or hear) it happening. I used to have the same problem when I wasn't using a Radio Shack tape recorder.

Color Distress

• *Since I purchased my CoCo ('F' board) a couple of years ago, there has been a problem with display of colors in the graphics* PMODEs. *I asked Radio Shack to correct this when they upgraded to 64K, but there was no improvement. I decided then that the fault must be in the color convergence of the TV set I was using as a monitor, but recently I was able to check the convergence of the TV with a cross-hatch and color bar generator and found it was very near perfect.*

As a result, I have to conclude that the fault is in the video display generated in the CoCo. My conclusion is reinforced by the fact that software such as VIP Writer *that I am now using with Hi-Res display works perfectly while using the black-on-green option, but blooms terribly with offset colors with a white background. This I attribute to the fact that green is one of the three primary colors for the TV display, while white requires an overlay of the other primary colors, which in this case, do not overlay exacly.*

My question is what is the most likely culprit in my CoCo video generation system and how do I correct it? If it is the VDG chip (MC6847), this would be relatively easy to replace, but I have a feeling the trouble is more of a tuning problem. How is the output of the CoCo modulated for TV use and could this be it?

George Q. Slocum
Ossining, NY

George, the MC6847 produces only composite video. Before the signal gets to your TV, it is processed by a 1372 modulator. The modulator is contained in a metal box in the rear center of your PC board. I doubt that the problem is in the 6847, but rather in the RF modulator circuit. My old TV-repair days tell me that blooming is caused by overloading the input to your TV.

Modem Musing

• *I have been contemplating buying a modem. Can you explain the different terminology? Will a 300 Baud modem work at 1200 Baud? What are the advantages of 1200 Baud?*

Doris Stewart
Louisville, KY

First of all, Doris, you cannot convert a 300 Baud modem to 1200 Baud. Bell Systems wrote the standards for modems. The most common type of modem is manufactured to the Bell 103 standard, or a 300 Baud, tone-shift telephone interface. All a modem does is convert the RS-232 voltage levels coming from your computer to tones that can be transmitted over your telephone line.

There are two common Bell standards used for 1200 Baud, the 202 and the 212. The standard 1200 Baud modem used for BBSs, etc., is the 212, or phase-shift standard. All of the modems I have seen in THE RAINBOW conform to this standard.

The 201 standard is a tone-shifted model, but it's not in common use. You could possibly convert a 300 Baud modem to use the 201 standard, but then you would not be standard anymore!

As far as whether to buy a 300 or 1200 Baud modem, I guess the deciding factors are whether you are paying for connect time, how fast you type and read, and how much downloading you do. If your answers are "yes," "fast" and "a lot," you need a 1200 Baud modem. Otherwise, I wouldn't spend the extra money.

Three Questions about Drive 0

• *I have a 64K CoCo 2 and have recently purchased a Cat. No. 26-3029 Drive 0 with Disk BASIC 1.1 from the Radio Shack "discontinued" table. I have a few questions concerning its operation.*

1) I have been using utilities out of back RAINBOW issues. I have been using the 40-track utility out of "Getting on the Right Track" [July 1985, Page 26] and also ROM RAM *from "Downloads" [March 1984, Page 288]. I also have been using the* POKEs *from the April 1985 issue [Page 252] in the "Downloads" column to speed up my drive. I can run my drive at six ms without ?IO Errors. My question is, is it safe for me to run my drive at six ms? Could I harm my drive?*

2) My drive becomes very hot. I noticed through the vent that two three-pronged chips are causing the heat. The board has the codes VR1 and VR2 beside the chips. What can I do about this excess heat?

3) I have tried to format the back side of a Tandy disk. I cut out a notch in the side, but when I try to format, I receive an ?IO Error. My friend's C-64 will format the back side of a Tandy disk. Is there a way to get the CoCo to do it?

Kevin Gibson
Lubbock, TX

Don't worry about your disk drives, Kevin. The only thing you do when operating them at six ms is speed up the stepping motor that positions the heads on the correct track.

As far as the heat near VR1 and VR2, these are voltage regulators and they are supposed to dissipate heat as part of their function.

When you notched the other side of your disks, I'll bet you didn't punch another timing hole through the inside of the jacket. This hole is approximately ¼ inch in diameter and located about an inch from the center of the disk.

Be very careful not to touch the disk. Some people even remove the disk from the jacket by peeling back the end flap, removing the media and gluing the flap back when they are finished. Make yourself a template of the notch and the timing hole, then turn the disk over. Put the notch and the timing hole in the jacket at the same locations on the reverse side. Most people use an old "paper boy" punch for the timing hole. Its size is not real critical as long as it is at least as big as the previous hole. You should then be able to use the reverse side of your disks.

Your technical questions are welcomed. Please address them to: Downloads, THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We reserve the right to publish only questions of general interest and to edit for space and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Your technical questions may also be sent to us through the MAIL section of our new Delphi CoCo SIG. From the CoCo SIG> prompt, pick DELPHI MAIL, then type SEND and address TO: DANDOWNARD.

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CBASIC features well over 100 Basic Commands and Functions that fully support Disk, Tape, Printer and Screen I/O. It also supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Extended Color Basic, and all with 99.9% syntax compatibility.

CBASIC is FAST. Not only will CBASIC compiled programs execute 10 to 1000 times faster than Basic, but the time it takes to develop a CBASIC program versus writing a machine language program is much, much shorter. A machine language program that might take several months to write and debug could be created using CBASIC in a matter of days or hours, even for a well experienced machine language programmer. We had a report from a CBASIC user that claimed "a Basic program that used to take 3 hours to run, now runs in 7 to 8 minutes". Another user reported a program that took 1 to 1½ hours to run in Basic, now runs in 5 to 6 minutes!!!

MORE THAN JUST A COMPILER

CBASIC has its own completely integrated Basic Program Editor. The Editor contained in CBASIC is used to Create and/or Edit programs for the compiler. It is a full featured editor with functions designed specifically for writing and editing Basic programs. It has built-in block Move and Copy functions with automatic program renumbering. Complete, easy to use inserting, deleting, extending and overtyping of existing program lines. It is also used for Loading, Saving, Appending (merging), Killing disk files and displaying a Disk Directory. It also has automatic line number generation for use when creating programs or inserting sequencial lines between existing lines. You can set the printer baud rate and direct normal or compiled listings to the printer for hard copy. The built-in editor makes program corrections and changes as easy as "falling off a log". If CBASIC finds an error when compiling, it points to the place in the program line where the error occurred. All you have to do is tell the editor what line you want to start editing and when it is displayed, move the cursor with the arrow keys to the place where the error is and correct it. Just like that, it's simple.

HI-RES & 80 COLUMN DISPLAYS

CBASIC is the only Color Basic Compiler that includes its own Hi-Resolution 51, 64 or 85 by 24 line display. It is also the only compiler that supports both the PBJ "Word-Pak" and the Double Density 80 column cards. All of these display formats are part of the standard CBASIC compiler package. Not only can these display formats be used for normal program editing and compiling, but CBASIC will also include them in your compiled programs! If you want CBASIC to include the display driver in your program, all you have to do is use a single CBASIC command "HIRES". The run-time display driver that CBASIC includes in your program is not just a simple display, but a full-featured display package. With the Hi-Resolution display package you can mix text & graphics, change characters per line, underline, character highlight, erase to end of line or screen, home cursor, home & clear screen, protect screen lines, and much more. All commands are compatible with our HI-RES II Screen Commander so you can easily develop screen layouts using HI-RES and Color Basic before you compile your program. The same applies to using the 80 column card drivers. What other Basic compiler offers you this kind of flexibility?

64K RAM SUPPORT

CBASIC makes full use of the power and flexibility of the 6883 SAM (Synchronous Address Multiplexer) in the Color Computer. It will fully utilize the 96K of address space available in the Color Computer (64K installed) during program Creation, Editing and Compilation. CBASIC has a special command for automatic 64K RAM control. When used in a program, it allows the user to use the upper 32K of RAM space automatically for variables or even program storage at run-time. It will automatically switch the ROMs in and out when needed. There are also two other commands that allow you to control the upper 32K of RAM manually, under program control. No other Color Basic compiler directly supports the use of 64K RAM like CBASIC.

ALL MACHINE LANGUAGE

CBASIC is completely written in fast efficient Machine Language, not Basic, like some other Color Basic compilers. Because of this, CBASIC can edit and compile very large programs. Even using the Hi-Resolution 51 by 24 line display, it can work with about a 34K program, and the 80 column card versions can handle almost 40K of program. Some of the other Basic compilers can only work with 16K or about 200 lines. Even working with large programs, CBASIC compiles programs with lightning fast speed. It will compile a 24K program to disk in less than 2 minutes! That's without a listing being generated. We've heard stories about some other compilers that take almost 10 minutes to compile a simple 2-3K program. You might inquire about this when you look at some of the other compilers available.

THE FINISHED PRODUCT

Since CBASIC contains statements to support ALL of the I/O devices (Disk, Tape, Screen & Printer), Hi-Res Graphics, Sound, and Enhanced Screen displays, it is well suited for a wide range of programming applications. It generates a complete, Ready to Run machine language program. The finished product or program does not have to be interfaced to a Basic program to perform some of its functions or commands. This may seem obvious to you, but some of the other Color Basic compilers don't necessarily work this way. Some of their compiler commands need a separate Basic program in order for them to work. In some cases, require that a separate Basic program be interfaced to the compiled program to perform I/O functions, like INPUT, PRINT and so on. CBASIC doesn't do this. ALL of its commands are compiled into a single machine language program that does not require any kind of Basic program to make it work.

COMPATIBILITY

You may be wondering about those statements we made earlier concerning 99% or 99.9% syntax compatibility. What does that other 1% consist of? The biggest part of that 1% has to do with string arrays and variables. CBASIC does not use a "String Pool" like Color Basic. It uses absolute memory addresses to locate string variables and arrays. This is why CBASIC's string processing is so fast, it also eliminates the time consuming "Garbage Collection" problem. When CBASIC allocates space for strings, it must know how much space to use for each string. When you Dimension a string variable in CBASIC, you must tell it how much space you want to save for each element. To Dimension an array of 40 strings, 64 characters each, you would DIM DA$(40,64). If a string is not dimensioned, CBASIC will automatically allocate 32 bytes for it. If you want a single string to have enough room for 200 characters you would DIM AX$(200). For string arrays, you would still access the element you want, the same as Color Basic, to get string #30 from the array DA$, you would still use DA$(30), the only real change is in the DIM statement. For undeclared string arrays of 10 elements or less, CBASIC will automatically reserve space for 10 (0-9) strings of 32 characters. In some other Color Basic compilers, you have to declare EVERY string variable used in the progrm in a DIM statement. And, to create an array of 40 strings with 64 characters each, you would have to DIM AD$(2560), and then to access string #30, you would have to multiply 30 × 64 and use a special variable name format or access it one character at a time. Not very compatible or convenient to use, and difficult at best.

CBASIC REQUIREMENTS

CBASIC requires a minimum of 32K RAM and at least one Disk drive. We strongly recommend that you have 64K. CBASIC is compatible with all versions of Color & Extended Basic and both Disk Basic V1.0 and V1.1. Programs compiled on either system will run on systems with different ROMs. CBASIC is NOT compatible with JDOS.

DOCUMENTATION

The Documentation provided with any program is very important to the user. This is especially true when you talk about a program as complete and complex as CBASIC. Even though CBASIC was designed to be the most User Friendly compiler on the market, we went to great lengths to provide a manual that is not only easy to use and understand, but comprehensive and complete enough for even the most sophisticated user. The manual included with CBASIC consists of approximately 120 pages of real information, not like some manuals that put just one or two short paragraphs on a page. If we did it that way, we could have easily created a three or four hundred page manual. The manual index breaks down each section of the manual and gives a 3 or 4 word description of each section and its items along with page numbers. The manual has three sections, the Editor, Compiler and Appendix. Each of these is divided into subsections, with Section and Subsection titles printed at the top of each page. If you want to, you could find the information you are looking for by simply flipping through the pages and scanning the Section titles on the top of the pages. The Manual itself is an 8½ by 11 Spiral Bound book with durable leather textured covers. Some of the reports we have had from CBASIC users describe the manual as being the Best program manual they have ever used.

COMPARE THE DIFFERENCE

CBASIC is not just another Color Basic Compiler. It is the only complete Basic Compiler System for the Color Computer. Compare CBASIC's features to what other compilers offer and you'll see the difference. When comparing CBASIC to other compilers, you might want to keep some of these questions in mind. Does it support I/O functions? You can't write much of a program without PRINT, INPUT and so on. What about complex string statements, or string statements at all? How large of a program can you write? Can you compile a complex string like: MID$(RIGHT$(DA$(VAL(IN$),LEN(LE$)),3,3)? Can you use two character variable names for string & numeric variables, like Basic. Does it support all the Hi-Res graphics statements including PLAY, DRAW, GET and PUT, using the same syntax as Basic? Do you ever have to use a separate Basic program? Can you take complete Basic programs and compile them without extensive changes? Will they work? How do you edit a program when it has errors compiling?

PRICE VERSUS PERFORMANCE

The price of CBASIC is $149.00. It is the most expensive Color Basic Compiler on the market, and well worth the investment. We spent over 2 years writing and refining CBASIC, to make it the Best, most Compatible Color Basic compiler available. Most of our CBASIC users already bought one or more of the other compilers on the market and have since discarded them. We even traded in a few of them. If you want a cheap compiler, we'll sell you one of those traded in, at a good price. Before you buy a compiler, compare the performance of CBASIC against any Color Basic compiler. Dollar for Dollar, CBASIC gives you more than any other Color Basic compiler available.

ORDERING INFORMATION

To order CBASIC by mail, send check or money order in the amount of $149.00 plus $3.00 for shipping and handling to the address listed below.

To order by VISA, MASTERCARD or COD, call us at: (702) 452-0632 (Monday thru Saturday, 8am to 5pm PST).

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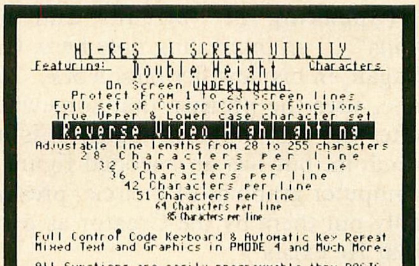

```
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Upper/Lower case characters	Yes	Yes	Yes
Mixed Text and Graphics	Yes	Yes	Yes
Separate Text & Graphics	Yes	Yes	No
Print @ fully implemented	Yes	Yes	Yes
Print @ on all line lengths	Yes	Yes	51 only
Different line lengths	28 to 255 (9)	28 to 255 (9)	51 only (1)
Automatic Key Repeat	Yes	Yes	Yes
Adjustable Key Repeat	Yes	No	No
Auto Repeat Disable	Yes	No	No
Erase to end of line/screen	Yes	Yes	Yes
Home Cursor	Yes	Yes	Yes
Solid or Blinking Cursor	Yes	No	Yes
CLS command supported	Buff/Black	Buff/Black	Buff/Black
X.Y Coordinate Cursor Positioning	Yes	Yes	No
Double Size Characters	Yes	Yes	No
Individual/Continuous Highlighting	Yes	Yes	No
On Screen Underlining	Yes	Yes	No
Clear Key functional	Clear/L keys	Clear key	No
16 32 & 64K Supported	Yes	Yes	Yes
Green or Black Background Color	Yes	No	No
Dual Character sets for Enhanced 64 and 85 Characters per line display	Yes	No	No
Protected Screen Lines (programmable)	1 to 23	No	No
Full Control Code Keyboard for Screen control directly from the keyboard	Yes	No	No
Programmable Tab Character Spacing	Yes	No	No
Full Screen Reverse Function	Yes	Yes	No
Switch to & from the Standard 16 by 32 Screen for full compatability	Yes	No	No
On Error Goto Function	No	No	Yes
Extended Basic Required	No	Yes	Yes
All Machine Language Program	Yes	Yes	Yes
RAM Required in addition to Screen RAM	2K	2K	2K
Program Price (Tape)	$24.95	$19.95	$29.95

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BARDEN'S BUFFER

Pi to 10,000 Digits

**By William Barden, Jr.
Rainbow Contributing Editor**

Imagine this scene: A friend who owns an Apple IIe or IBM PC walks into your house and makes his usual remark about your "toy CoCo." "What's it doing now," he says with a sneer, "warming up?" Casually flicking a piece of chad off the keyboard, you reply, "No, actually it's calculating pi to 10,000 digits . . ."

This was the scene I envisioned when I first planned this article. Many hours later, I'm a little weary, but still enthusiastic about this month's topic, even though 10,000 digits may be a little optimistic. Imagine using your CoCo's number crunching ability to calculate pi to thousands of decimal places, something that was never really done until the 1950s! A little background might explain the problem.

Pi through History

Pi, of course, is the ratio of the distance around a circle to the diameter of the circle. As many of you know, pi is approximately 3.1416. A circle with a diameter of 10 inches, for example, has a circumference of about 31.416 inches. It's important to note that pi is an *irrational* number — it's not "even" and goes on to infinity as a never ending fraction. The fraction appears to be made up of random digits. Translating the digits into text characters, for example, would produce every book ever written somewhere within the first billions of billions of digits.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years experience in the industry covers a wide background: programming, systems analyzing and managing projects ranging from mainframes to microcomputers.

(Speaking of "bilyuns and bilyuns". . . an interesting note here. Carl Sagan, in his new fictional work, *Contact*, uses the premise that somewhere after the first umpteen digits, pi is *not* random, but has an encoded figure in computer graphics of a circle, presumably put there by the Creator as proof that He exists!)

Believe it or not, the Babylonians had calculated pi to be 3⅛ by about 2000 B.C. Even more incredible, the Chinese had arrived at a value of pi of 3.14159 by 264 A.D., an accuracy of 0.0003%!

Early calculations of pi used a method that inscribed thousands of polygons, as shown in Figure 1. The approximation of a circle by polygons gave pi to within 35 decimal places by the 1600s. At that point, however, differential calculus was discovered, and it was found that pi could be expressed as an *infinite series* of terms. The best known of these series for pi was discovered by Leibniz in 1674:

$$pi = 4(1 - 1/3 + 1/5 - 1/7 + . . .)$$

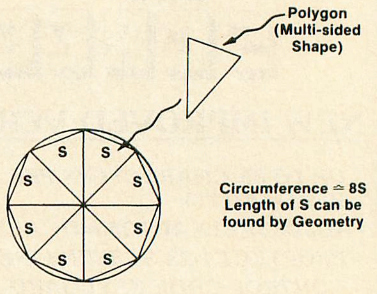
Polygon (Multi-sided Shape)
S
S
S
S
S
S
S
S
Circumference ≈ 8S
Length of S can be found by Geometry

Figure 1: Finding Pi by Inscribed Polygon

Try it with a BASIC program. It works, but requires hundreds of terms to get even several digits of accuracy. From the moment the infinite series method was discovered, a race for calculating pi to the most places ensued, just as it had with polygon approximations. Machin discovered a useful series in 1706, one that *converged* very quickly — only a few terms were required to yield pi to a dozen places or so:

```
pi = 16(1/5 - 1/(3*5^3) + 1/(5*5^5 2- . . .)
-4(1/239 + 1/(3*239^3) - (1/(5*239^5) + . . .)
```

The Machin series and others have been used in recent times to calculate pi to thousands of places on large mainframe computers, just as they are typically used to search for special prime numbers (Mersenne primes of the form 2^N - 1). There's really not a great deal of use for the next hundred thousand places of pi or the next Mersenne prime, but it's fun to do because, like Mt. Everest, pi is *there*. And besides, maybe there *is* that graphical representation of a circle after the billionth digit or so.

(An excellent and fascinating treatment of the history of pi from ancient times to the computer age is contained in the book *A History of Pi* by Peter Beckmann [St. Martin's Press, 1971].)

Because It's There

In this column we'll show you how to compute pi to many places — up to 10,000 decimal digits if you're so inclined (and have a few years)! It won't be an easy task, but it can be a fun project, and it's a perfect squelch to that friend or neighbor who owns an Apple IIe, IBM PC or Cray X-MP. (This column took about three times the nominal time to research and write, but I still had fun.)

Multiple-Precision Variables

One basic question in computing pi is how 10,000 digits can be represented in a computer system. There are several alternatives. You could store one digit in each byte, or maybe two digits in four bits, two per byte. Each four bits would be *binary coded decimal*, or bcd. However, bcd is a little messy to work with for divides, although it's great for adds and subtracts. You could also use tried and true binary. A little review of binary probably won't hurt at this point.

A byte can hold eight bits — values of 00000000 through 11111111 or zero through 255. Two bytes can hold zero through 65,535. Four bytes can hold zero through 4,294,967,296. As a matter of fact, you can make the binary operand as large as you wish. A good rule of thumb is that each 3.5 bits can hold one decimal digit. So 10,000 decimal digits require about 35,000 bits, or about 4,375 bytes. A better calculation of this is 10,000 divided by log base 10 of 2 = 10,000/.301 or 33,219+ bits, 4,152+ bytes.

We'll use up to 4,154 bytes, therefore, to hold up to 10,000 decimal digits. For the sake of convenience in the following discussion, we'll call these 4,154-byte variables, MPVs or Multiple-Precision Variables. We'll need a number of these MPVs, some to hold temporary results and some to hold the final results, just as we use several variables in a BASIC program.

Scaling and Division

The next major problem is the actual calculation — how can we divide 1 by 239, for example? In BASIC it is done by floating-point variables. We can't use floating-point here because we need the *exact* numbers to be represented. Typical BASIC floating-point variables only allow 16 decimal digits of precision — we need thousands of digits of precision!

To accomplish addition, subtraction, multiplication and division of the terms in the calculation, we'll use only integer arithmetic. A question you might be asking, though, is how can we get fractional results with integers? The answer is an old technique, dating back to the '50s or beyond — scaled numbers. Instead of using 1 in the term 1/239, we'll *scale up* the numerator by a factor of 10 followed by 10,000 zeros (for the maximum case), so the term becomes 10,000,000,000...,000/239. The result of the divide and other operations is always an integer number, and we can stick in the decimal point when we print the answer. I'll show you how it works shortly. The results of all adds, subtracts, multiplies and divides are kept in the MPVs in integer form, without fractions.

The Algorithm

In a difficult problem such as this, it's best to have a good algorithm before you go charging off into the actual code. There are many ways this calculation can be implemented, but the plan I came up with follows. First, the variables:

1) Use three MPVs, called TEMP1, TEMP2 and SUM.

2) Use a 16-bit variable called DIVSOR to hold the 1, 3, 5, 7, etc., . . . to be divided into the term.

3) Use a 16-bit variable called LAST to hold the last divisor to test for the end of each of the two sets of divisions.

4) Use an eight-bit variable called ODDEVN to control whether the term is added to or subtracted from the subtotal.

Now the actual plan, divided into two parts, is computation of the first set of terms and calculation of the second set of terms:

```
SUM <- 0
TEMP1 <- 1
LAST <- XXXX
ODDEVN <- 1
DIVSOR <- 1
while DIVSOR < LAST ao
   begin
     if DIVSOR-1 then TEMP1 <- TEMP1/5 else
        TEMP1 <- TEMP1/25
     TEMP2 <- TEMP1
     TEMP2 <- TEMP2/DIVSOR
     if ODDEVN-1 then SUM <- SUM + TEMP2 else
        SUM <- SUM - TEMP2
     DIVSOR <- DIVSOR + 2
     flip ODDEVN to 1 if 0 or 0 if 1
   end
SUM <- SUM*4
TEMP1 <- 1
LAST <- XXXX
ODDEVN <- 0
DIVSOR <- 1
while DIVSOR < LAST do
   begin
     if DIVSOR-1 then TEMP1 <- TEMP1/239 else
        TEMP1 <- TEMP1/(239*239)
     TEMP2 <- TEMP1
     TEMP2 <- TEMP2/DIVSOR
     if ODDEVN-1 then SUM <- SUM + TEMP2 else
        SUM <- SUM - TEMP2
     DIVSOR <- DIVSOR + 2
     flip ODDEVN to 1 if 0 or 0 if 1
   end
SUM <- SUM*4
```

In case you're not familiar with the notation used here, it's a form of "PDL" or Program Design Language. Variables are indicated by uppercase. The arrows indicate that a variable is set to the terms on the right-hand side of the equation. The *begin* and *end* words mark the beginning and ending of a block of operations. The *while* function means that the following block is to be done as long as the condition is true, in this case DIVSOR less than LAST. You can see that the sequence is divided into two parts, one for the 5/25 divides, and one for the 239/(239*239) divides.

If you don't see how this works, try the algorithm with paper and pencil. Note that variable TEMP1 holds 1/5 the first time through, 1/5^3 the next time, 1/5^5 the next time, and so forth (or 1/239, etc., for the second part). The current DIVSOR is divided into the current power of '5' (or power of 239 term). The result is then added to or subtracted from the SUM.

The "LAST" values are not obvious. The values represent the last divisor (preceding the power) to be used. This divisor equals the power of the current term. Each term of the first set is smaller than the preceding term by about 1/25th. Each term of the second set is smaller than the preceding term by about 1/(239*239). Divide the number of decimal digits in the MPV by .69897 and add 10 percent of that for the LAST value for the first set. For example, if you're working with 10-byte MPVs, the 80 bits can hold about 22+ decimal digits, so use 22+/.69897 or 33 + 3 = 37 as the LAST value. (LAST values must be odd.) Divide the number of decimal digits by 2.37 for the LAST value for the second set. In this example, 22+/2.37 gives you 9+, or 11 to be safe.

The only thing that's been left out of the algorithm is the scaling. In fact, '1' is not put into the MPV — a power of 10 is, such as 10,000,000...,000. This poses a problem. How can you figure out the value to store into the MPV for the power of 10? For short length MPVs, it's easy. If the MPV is one byte, for example, you'd use $64, equivalent to 100. For two bytes, you'd use $2,710 for 10,000. When you're working with 10 followed by 10,000 zeros, though, it becomes impossible to calculate the actual value to be put into the MPV, or at least terribly difficult. About the only efficient way to do it is to let the computer do it for you.

One way to store a power of 10 is to put 10 into the bottom of the MPV and then keep multiplying by 10. Because I wanted to be able to use any length MPV from several bytes to 4,154 bytes, I chose this method:

```
MPV <= 1
while highest byte of MPV = zero do
  begin
    MPV <= MPV*10
  end
```

The result of this operation is shown for several lengths of MPVs in Figure 2.

Planning the Modules

The structure of the program is shown in Figure 3. Like a lot of programs, this structure didn't just jump from head to paper, but was modified during the design and coding process. There are 10 modules in the program.

We'll start with the easiest ones first (perhaps you've noticed this flaw in my character by now) SHIFT shifts an MPV one bit to the left. This doesn't sound like much, but remember that all the bytes of the MPV, from a few bytes to 4,154 bytes, must be shifted with the high-order bit going into the low-order bit of the next higher byte, as shown in Figure 4.

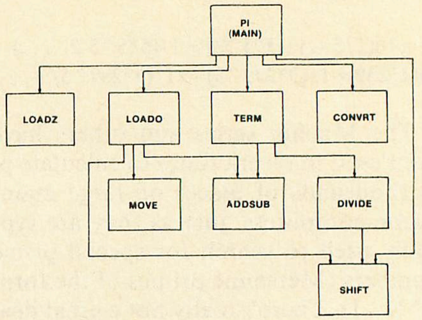

Figure 3: *PI* Program Structure

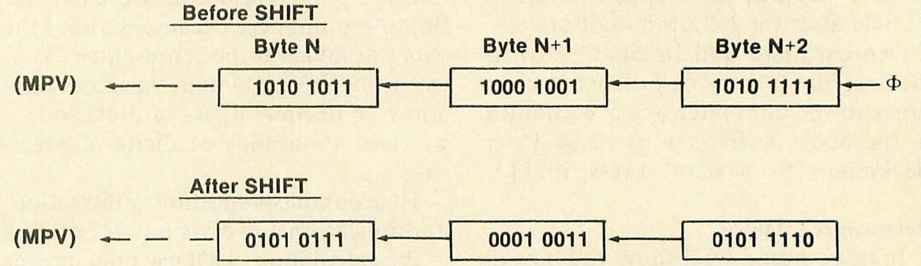

Figure 4: Multiple Byte Shifting

Easy Modules

LOADZ loads a zero into all bytes of the MPV.

LOADO first loads a zero into all bytes of the MPV. A scaled one is then loaded into the MPV. This involves loading '1' into the low-order byte of the MPV and then multiplying by 10 as described above.

MOVE moves all the bytes of one MPV into a second MPV, a simple copy operation.

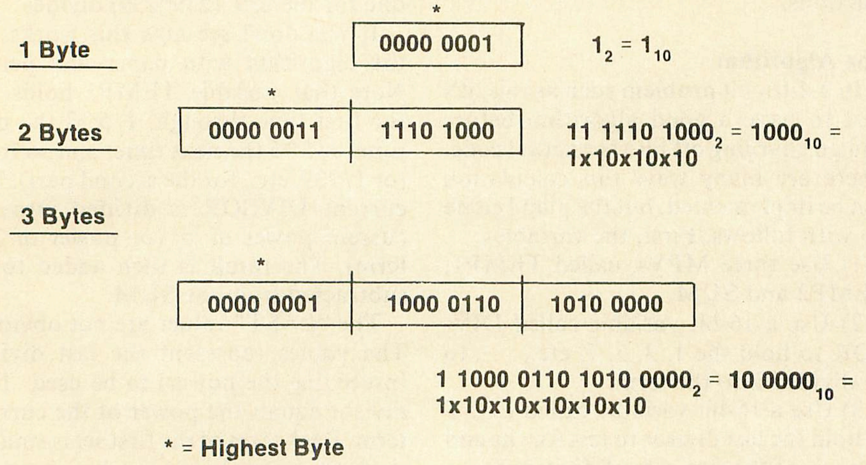

Figure 2: Scaling a Value

ADDSUB adds the contents of one MPV (the "source" MPV) to the contents of a second MPV (the "destination" MPV), or subtracts the two MPVs. In doing this, any "carry" or "borrow" must be carried over to the next byte, just as in decimal addition or subtraction.

The Heart of the Program

DIVIDE is the heart of the program. This subroutine must be as fast as possible to cut down on the program overhead. The structure of DIVIDE is shown in Figure 5. A 16-bit divisor (DIVSOR or 5 or 239) is divided into the MPV. The MPV is shifted into Register D one bit at a time. For each shift, a test is made to see whether the divide will "go." If so, a subtract of the divisor is done and a quotient bit is set to '1'. If not, the quotient bit is set to '0'. Directly after the dividend is shifted into D, the next quotient bit is filled into the low end of the MPV. At the end of the divide, the quotient bits have filled up the entire MPV and the remainder of the divide is in D.

Other Modules

TERM is the subroutine that actually carries out the calculation of each term,

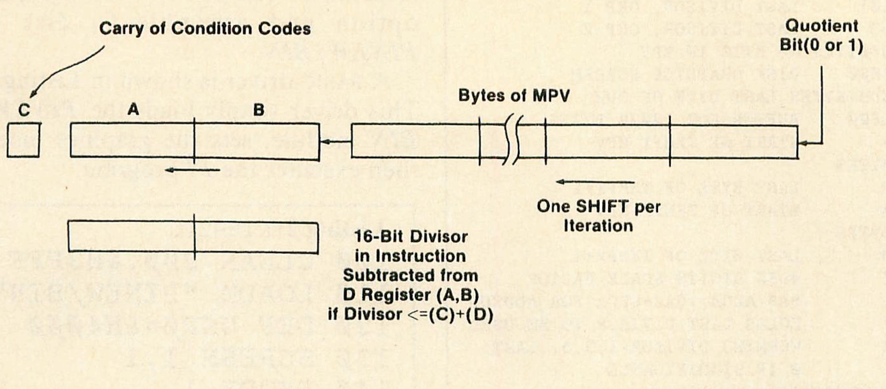
Carry of Condition Codes
Quotient Bit(0 or 1)
C
A
B
Bytes of MPV
One SHIFT per Iteration
16-Bit Divisor in Instruction Subtracted from D Register (A,B) if Divisor <=(C)+(D)

Figure 5: DIVIDE Structure

adding or subtracting the term to SUM. TERM is called twice, once for each set of values.

CONVRT is a convert to ASCII subroutine. After all of the calculations have been done, the result is in SUM as a scaled-up value. This huge binary number must now be converted to decimal by successively dividing by 10 and saving the remainders, as shown in Figure 6. The remainders in reverse order represent the equivalent decimal number. Before they are printed, the decimal value of zero through nine is converted to ASCII by adding $30. The remainders are stored in a buffer, one remainder per byte. This buffer is more than twice as big as an MPV, so two MPVs and additional memory is used for the conversion process.

PI is the "main driver" portion of the program. It calls the subroutines to implement the calculations and generally oversees the operations.

The Actual Assembly Language

I don't mind telling you that the *PI* program grew far beyond what I had imagined it would consist of. However, it's still small enough for you to follow fairly easily. Its structure follows the physical arrangement in Figure 3 and is listed in Listing 1.

Listing 1: PINEW

```
                    00100 ******************************************
                    00110 * PI TO 10,000 DIGITS ON THE COCO!       *
                    00120 ******************************************
4000                00130         ORG     $4000
                    00140
4000 16     0774    00150         LBRA    PI
                    00160 ******************************************
                    00170 *BUFFERS AND WORKING STORAGE             *
                    00180 ******************************************
                    00190 * CHANGE BYTES, TERM1, AND TERM2 FOR *
                    00200 * DIFFERENT RESOLUTIONS OF PI            *
            0032    00210 BYTES   EQU     50      4154 BYTES = 10000 DIGITS
```

There are three MPVs used in the program, designated TEMP1, TEMP2 and SUM. To change the size of the MPVs, set the parameter Bytes to the number of bytes required. The number of Bytes must be even due to the methods of storage and access in the program. I used values from four up to hundreds. Maximum size is on the order of 4,154 bytes. Remember that changing the number of bytes also requires that you change the TERM1 and TERM2 "LAST" values. Too large a value for LAST and you'll be wasting time; too small a value and you will lose digits in the answer.

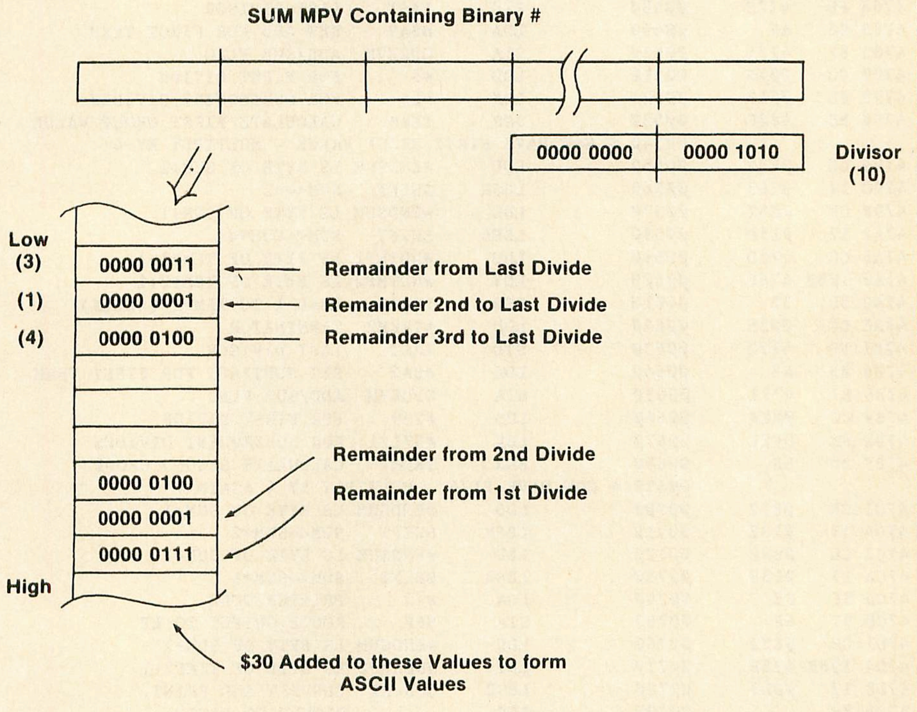
SUM MPV Containing Binary #
0000 0000
0000 1010
Divisor (10)
Low
(3)
(1)
(4)
High
0000 0011
0000 0001
0000 0100
0000 0100
0000 0001
0000 0111
Remainder from Last Divide
Remainder 2nd to Last Divide
Remainder 3rd to Last Divide
Remainder from 2nd Divide
Remainder from 1st Divide
$30 Added to these Values to form ASCII Values

Figure 6: Conversion of Final Result

The SUM MPV is ORGed at the graphics display area (set this to $600 for cassette systems). More about that later, but as you might guess, locating the SUM MPV in the graphics screen area allows you to see *PI* being computed.

The program is ORGed at $4000. You can change this to below the $4000 area if you have a 16K system, but will not be able to use larger MPVs. (The program is about 400 bytes exclusive of the MPV areas.) The version shown was assembled with the Radio Shack Disk

```
          00B5     00220 TERM1    EQU    181      LAST DIVISOR, GRP 1
          0035     00230 TERM2    EQU    53       LAST DIVISOR, GRP 2
          0190     00240 BITS     EQU    8*BYTES =# BITS IN MPV
          0E00     00250 SUM      EQU    $E00     DISK GRAPHICS SCREEN
          0E32     00260 ENDSUM   EQU    SUM+BYTES LAST BYTE OF SUM
4003               00270          RMB    1800     BUFFER FOR 10000 BYTES
          470B     00280 TEMP1    EQU    *        START OF TEMP1 MPV
470B               00290          RMB    BYTES
          473D     00300 NDTMP1   EQU    *        LAST BYTE OF TEMP1+1
          473D     00310 TEMP2    EQU    *        START OF TEMP2 MPV
473D               00320          RMB    BYTES
          476F     00330 NDTMP2   EQU    *        LAST BYTE OF TEMP2+1
476F               00340 SCALE    RMB    2        #DEC DIGITS SCALE FACTOR
4771               00350 ODDEVN   RMB    1        $A9-ADCA; $A2=SBCA FOR ADDSUB
4772               00360 LAST     RMB    2        HOLDS LAST DIVISOR TO BE USED
4774               00370 DIVSOR   RMB    2        WORKING DIVISOR-1,3,5..LAST
4776               00380 SIGNI    RMB    1        0 IF SIGNIFICANCE
                   00390 ****************************************
                   00400 * PI DRIVER                              *
                   00410 ****************************************
4777 CE   0E32     00420 PI       LDU    #ENDSUM POINT TO LS BYTE OF SUM+1
477A 8D   60       00430          BSR    LOADZ    ZERO SUM
477C CE   473D     00440          LDU    #NDTMP1 LS BYTE OF TEMP1+1
477F 108E 476F     00450          LDY    #NDTMP2 LS BYTE OF TEMP2+1
4783 8D   64       00460          BSR    LOADO    LOAD 1 TO TEMP1 (SCALE)
4785 CC   00B5     00470          LDD    #TERM1   TERMINATOR
4788 FD   4772     00480          STD    LAST     LAST DIVISOR
478B 86   A9       00490          LDA    #$A9     SET ADD FOR FIRST TERM
478D B7   4771     00500          STA    ODDEVN   ADD/SUB FLAG
4790 CC   0005     00510          LDD    #5       FOR FIRST DIVIDE
4793 8E   0019     00520          LDX    #25      FOR SUBSEQUENT DIVIDES
4796 BD   482C     00530          JSR    TERM     CALCULATE FIRST GROUP VALUE
                   00540 * NOW HAVE FIRST GROUP VALUE - MULTIPLY BY 4
4799 CE   0E32     00550          LDU    #ENDSUM LS BYTE OF SUM+1
479C 17   0163     00560          LBSR   SHIFT    SUM<=*2
479F CE   0E32     00570          LDU    #ENDSUM LS BYTE OF SUM+1
47A2 17   015D     00580          LBSR   SHIFT    SUM<=SUM*4
47A5 CE   473D     00590          LDU    #NDTMP1 LS BYTE OF TEMP1+1
47A8 108E 476F     00600          LDY    #NDTMP2 LS BYTE OF TEMP2+1
47AC 8D   3B       00610          BSR    LOADO    LOAD 1 TO TEMP1 (SCALE)
47AE CC   0035     00620          LDD    #TERM2   TERMINATOR
47B1 FD   4772     00630          STD    LAST     LAST DIVISOR
47B4 86   A2       00640          LDA    #$A2     SET SUBTRACT FOR FIRST TERM
47B6 B7   4771     00650          STA    ODDEVN   ADD/SUB FLAG
47B9 CC   00EF     00660          LDD    #239     FOR FIRST DIVIDE
47BC 8E   DF21     00670          LDX    #57121   FOR SUBSEQUENT DIVIDES
47BF 8D   6B       00680          BSR    TERM     CALCULATE SECOND GROUP
                   00690 * NOW HAVE PI/4 - MULTIPLY BY 4 AGAIN
47C1 CE   0E32     00700          LDU    #ENDSUM LS BYTE OF SUM+1
47C4 17   013B     00710          LBSR   SHIFT    SUM<=SUM*2
47C7 CE   0E32     00720          LDU    #ENDSUM LS BYTE OF SUM+1
47CA 17   0135     00730          LBSR   SHIFT    SUM<=SUM*4
47CD 86   FE       00740          LDA    #-2      PRINTER CODE
47CF 97   6F       00750          STA    $6F      ROUTE OUTPUT TO LP
47D1 CE   0E32     00760          LDU    #ENDSUM LS BYTE OF SUM+1
47D4 108E 476F     00770          LDY    #NDTMP2 LS BYTE OF TEMP2+1
47D8 17   00B3     00780          LBSR   CONVRT   CONVERT AND PRINT
47DB 39            00790          RTS             RETURN TO BASIC
                   00800 ****************************************
                   00810 * LOAD 0 SUBROUTINE                      *
                   00820 * ENTRY: BYTES=SIZE OF MPV IN BYTES      *
                   00830 *        (U)=END OF MPV+1                *
                   00840 ****************************************
47DC 8E   0032     00850 LOADZ    LDX    #BYTES   GET # BYTES
47DF CC   0000     00860          LDD    #0       LOAD 0
47E2 ED   C3       00870 LOA010   STD    ,--U       STORE 0
47E4 30   1E       00880          LEAX   -2,X       DECREMENT COUNT
47E6 26   FA       00890          BNE    LOA010     GO IF NOT DONE
47E8 39            00900          RTS             RETURN
                   00910 ****************************************
                   00920 * LOAD 1 AND SCALE SUBROUTINE            *
                   00930 * ENTRY: (U)=END OF MPV+1                *
                   00940 *        (Y)=END OF TEMP MPV+1           *
                   00950 * EXIT:  1 * SCALE FACTOR LOADED         *
                   00960 *        SCALE SET TO SCALE FACTOR       *
                   00970 ****************************************
47E9 34   60       00980 LOADO    PSHS   Y,U      SAVE POINTERS
47EB 8D   EF       00990          BSR    LOADZ    ZERO MPV
47ED 35   60       01000          PULS   Y,U      RESTORE POINTERS
47EF 86   01       01010          LDA    #1       1
47F1 A7   5F       01020          STA    -1,U     STORE FOR SHIFT AND ADD
```

Assembler (26-3254). Use the /SR option and assemble to disk as *PINEW/BIN*.

A BASIC driver is shown in Listing 2. This driver simply loads the *PINEW/BIN* module, sets the graphics mode, then executes the *PI* program.

Listing 2: PIBASIC

```
100 CLEAR 200,&H3FFF
110 LOADM "PINEW/BIN"
120 DEF USR0=&H4000
130 SCREEN 1,1
140 PMODE 1
150 PCLS
160 A=USR0(0)
170 GOTO 170
```

Program Notes

Many of the subroutines use address pointers passed in Register U registers or U and Y. These pointers usually point to the end of an MPV plus '1'. The reason for this is that *auto-decrementing* is used in many subroutines. A pointer to the MPV points to the low-order byte, as operations such as multiple-precision adds and subtracts and shifts start there. An instruction such as STD ,--U (LOADZ) decrements Register U *before* the instruction is executed. After the decrement, the pointer points to the last 16-bit value. An autodecrement of ,-U works similarly, except the pointer points to the last byte after the auto-decrement. Using auto-decrement saves an LEAU -1,U or similar instruction.

The name of the game in much of this code is efficiency, especially in subroutines such as SHIFT and ADDSUB, which are used constantly. In DIVIDE, for example, good programming practice calls for using a divisor on the stack, or at worst, a memory variable. However, the divisor in DIVIDE is stored in an immediate instruction field just for the sake of squeezing out some extra speed by eliminating the instructions required in the multiply loop.

The LOADO subroutine uses a multiply of times 10 after initially storing a '1'. We could have used a generic multiply subroutine here, just as the DIVIDE is a generic divide. However, we used a well-known trick multiply — a type of shift and add. Multiplying by 10 is equivalent to shifting one bit left, saving the result as X2, shifting twice again to get eight times the original value, then adding the saved X2 term. The shift is done by the SHIFT subroutine, which we already have, and the multiple-precision add by ADDSUB.

The ADDSUB subroutine stores the flag for add or subtract into the OP3 instruction. The flag is also the actual opcode used for ADCA or SBCA. The two instructions are the same format otherwise.

The CONVERT subroutine uses a common method of converting from binary to decimal. Divide any binary number by 10. Save the remainder and divide the quotient by 10 again. Continue this process until the quotient reduces to zero. The remainders, in reverse order, are the equivalent decimal number. In this case we don't need to know how many digits are in the number to be converted, because that's handled automatically — the process stops when the quotient (residue, really) disappears.

We could have added a decimal point after the first decimal digit in printing out the answer — it must be '3'. However, we left it off in this version, having been beaten into apathy by the program. It might also have been nice to format the printout by arranging the data into groups of 10 digits. (All of this will be done in the next version.)

Seeing the Calculations

As I mentioned, *PI* actually lets you see the SUM term being calculated. When *PI* is executed, you'll see the screen clear. No further screen activity occurs while LOADO loads a scaled '1' into the first MPV. After this fill, however, the screen is partially filled with data. The amount of data depends upon the number of bytes you have selected for the MPVs and the screen mode used in the BASIC driver. The screen data represents the first value in SUM — the first term of the first set. As the program number crunches away, you'll see the data change, each change occurring to portions of the data further and further to the right and down, representing less and less significant digits. If you're running a version of the program that prints many digits, with significant time delays between term updates, keep your eye on a spot on the screen until the next change to zero-in on the digit positions being modified.

After the first set of data has been calculated, you'll see the next set of terms changing the data area. This set converges more rapidly. It starts from the high-order digits as well, but moves much faster through the screen area.

```
47F3 7F   476F     01030        CLR     SCALE   RESET SCALE FACTOR
47F6 34   60       01040 LON010 PSHS    Y,U       SAVE POINTERS
47F8 17   0107     01050        LBSR    SHIFT     X2
47FB 35   60       01060        PULS    Y,U       GET POINTERS
47FD 34   60       01070        PSHS    Y,U       SAVE POINTERS
47FF 1E   23       01080        EXG     Y,U       SWAP Y,U
4801 17   00B0     01090        LBSR    MOVE      SAVE X2
4804 35   60       01100        PULS    Y,U       GET POINTERS
4806 34   60       01110        PSHS    Y,U       SAVE POINTERS
4808 17   00F7     01120        LBSR    SHIFT     X4
480B 35   60       01130        PULS    Y,U       RESTORE POINTERS
480D 34   60       01140        PSHS    Y,U       SAVE POINTERS
480F 17   00F0     01150        LBSR    SHIFT     X8
  .2 35   60       01160        PULS    Y,U       RESTORE POINTERS
4814 34   60       01170        PSHS    Y,U       SAVE POINTERS
4816 86   A9       01180        LDA     #$A9      ADD CODE
4818 BD   48EF     01190        JSR     ADDSUB    X8 + X2 = X10
481B 35   60       01200        PULS    Y,U       GET POINTERS
481D FC   476F     01210        LDD     SCALE     SCALE IS COUNT OF DIGITS
4820 C3   0001     01220        ADDD    #1        BUMP BY 1
4823 FD   476F     01230        STD     SCALE     STORE
4826 A6   C8 CE    01240        LDA     -BYTES,U  POINT TO FIRST BYTE
4829 27   CB       01250        BEQ     LON010    GO IF NOT NORMALIZED
482B 39            01260        RTS             RETURN
                   01270 ****************************************
                   01280 * CALCULATE TERM SUBROUTINE            *
                   01290 * ENTRY: (LAST)=LAST DIVISOR VALUE     *
                   01300 *        (D)=FIRST DIVISIOR - 5/239    *
                   01310 *        (X)=SUBSEQUENT DIVISORS       *
                   01320 *        (ODDEVN)=ADD OR SUB OP CODE   *
                   01330 * EXIT:  (SUM) HOLDS FINAL VALUE       *
                   01340 ****************************************
482C FD   484D     01350 TERM   STD     TPI020+1 STORE 5 OR 239
482F BF   4848     01360        STX     TOP1+1  STORE 25 OR 239*239
4832 CC   0001     01370        LDD     #1      SET DIVISOR TO 1
4835 FD   4774     01380        STD     DIVSOR  STORE DIVISOR
4838 FC   4774     01390 TPI010 LDD     DIVSOR    GET DIVISOR
483B 10B3 4772     01400        CMPD    LAST      TEST FOR LAST
483F 22   4C       01410        BHI     TPI090    GO IF DONE
4841 1083 0001     01420        CMPD    #1        TEST FOR DIVISOR=1
4845 27   05       01430        BEQ     TPI020    GO IF SO
4847 CC   0000     01440 TOP1   LDD     #0        SQUARED TERM
484A 20   03       01450        BRA     TPI030    CONTINUE
484C CC   0000     01460 TPI020 LDD     #0        SQ RT TERM
484F CE   473D     01470 TPI030 LDU     #NDTMP1   LS BYTE OF TEMP1+1
4852 8D   6C       01480        BSR     DIVIDE    TEMP1/5 OR TEMP1/25
4854 CE   476F     01490        LDU     #NDTMP2   LS BYTE OF TEMP2+1
4857 108E 473D     01500        LDY     #NDTMP1   LS BYTE OF TEMP1+1
485B 8D   57       01510        BSR     MOVE      TEMP2<=TEMP1
485D FC   4774     01520        LDD     DIVSOR    GET CURRENT DIVISOR
4860 CE   476F     01530        LDU     #NDTMP2   LS BYTE OF TEMP2
4863 8D   5B       01540        BSR     DIVIDE    TEMP2<=TEMP2/DIVISOR
4865 CE   0E32     01550        LDU     #ENDSUM   LS BYTE OF SUM+1
4868 108E 476F     01560        LDY     #NDTMP2   LS BYTE OF TEMP2+1
486C B6   4771     01570        LDA     ODDEVN    GET ADD/SUB FLAG
486F 17   007D     01580        LBSR    ADDSUB    ADD/SUB TO TEMP2 TO SUM
4872 FC   4774     01590        LDD     DIVSOR    GET CURRENT DIVISOR
4875 C3   0002     01600        ADDD    #2        DIVISOR<=DIVISOR+2
4878 FD   4774     01610        STD     DIVSOR    SAVE FOR NEXT DIVIDE
487B B6   4771     01620        LDA     ODDEVN    GET ADD/SUB FLAG
487E 81   A9       01630        CMPA    #$A9      ADD?
4880 27   04       01640        BEQ     TPI040    GO IF ADD
4882 86   A9       01650        LDA     #$A9      SET TO ADD
4884 20   02       01660        BRA     TPI050    CONTINUE
4886 86   A2       01670 TPI040 LDA     #$A2      SET TO SUB
4888 B7   4771     01680 TPI050 STA     ODDEVN    STORE FOR NEXT ADD/SUB
488B 20   AB       01690        BRA     TPI010    LOOP
488D 39            01700 TPI090 RTS             RETURN
                   01710 ****************************************
                   01720 * CONVERT MPV TO DECIMAL AND PRINT     *
                   01730 * ENTRY: (U)=END OF SOURCE MPV+1       *
                   01740 *        (Y)=END OF DEST+1 2X MPV +    *
                   01750 * EXIT:  SOURCE DIGITS PRINTED IN DEC*
                   01760 ****************************************
488E 34   20       01770 CONVRT PSHS    Y       SAVE END OF DEST AREA
4890 CC   000A     01780 CON010 LDD     #10       DIVISOR FOR CONVERT
4893 34   60       01790        PSHS    U,Y       SAVE PARAMETERS
4895 8D   29       01800        BSR     DIVIDE    X/10
4897 35   60       01810        PULS    U,Y       RESTORE
4899 E7   A2       01820        STB     ,-Y       SAVE REMAINDER
489B B6   4776     01830        LDA     SIGNI     GET SIGNIF FLAG
```

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PCMfest is sponsored by our sister publication, PCM, *The Personal Computer Magazine for Tandy Computer Users.* The show will be in the same location as RAINBOWfest and the exhibit hours will be exactly the same. If you use one of the newer Tandy computers, don't miss it.

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Advance ticket deadline: May 16, 1986. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

```
489E 27   F0       01840          BEQ     CON010    GO IF Q NOT 0
                   01850 * NOW PRINT FROM (Y)
48A0 A6   A0       01860 CON020   LDA     ,Y+       GET DIGIT 0-9
48A2 8B   30       01870          ADDA    #$30      CONVERT TO ASCII
48A4 34   20       01880          PSHS    Y         SAVE POINTER
48A6 AD   9F A002  01890          JSR     [$A002]   PRINT
48AA 35   20       01900          PULS    Y         RESTORE POINTER
48AC 10AC E4       01910          CMPY    ,S        TEST FOR END
48AF 23   EF       01920          BLS     CON020    GO IF NOT END
48B1 35   20       01930          PULS    Y       RESET STACK
48B3 39            01940          RTS             RETURN
                   01950 **************************************
                   01960 * MOVE ONE MPV TO ANOTHER            *
                   01970 * ENTRY: BYTES=SIZE OF MPV IN BYTES  *
                   01980 *        (U)=END OF DEST MPV+1       *
                   01990 *        (Y)=END OF SOURCE MPV+1     *
                   02000 * EXIT:  DEST MPV NOW=SOURCE MPV     *
                   02010 **************************************
48B4 8E   0032     02020 MOVE     LDX     #BYTES  GET # BYTES
48B7 EC   A3       02030 MOV010   LDD     ,--Y      GET SOURCE WORD
48B9 ED   C3       02040          STD     ,--U      STORE IN DEST WORD
48BB 30   1E       02050          LEAX    -2,X      DECREMENT COUNT
48BD 26   F8       02060          BNE     MOV010    GO IF NOT DONE
48BF 39            02070          RTS             RETURN
                   02080 **************************************
                   02090 * DIVIDE MPV BY 16 BIT DIVISOR       *
                   02100 * ENTRY: BYTES=SIZE OF MPV IN BYTES  *
                   02110 *        BITS=SIZE OF MPV IN BITS    *
                   02120 *        (U)=END OF MPV+1            *
                   02130 *        (D)=DIVISOR                 *
                   02140 * EXIT:  (MPV)=QUOTIENT              *
                   02150 *        (D)=REMAINDER               *
                   02160 **************************************
48C0 FD   48DE     02170 DIVIDE   STD     OP1+2   SETUP DIVISOR
48C3 FD   48E3     02180          STD     OP2+1   SETUP DIVISOR
48C6 108E 0190     02190          LDY     #BITS   LOAD # BITS IN MPV
48CA 86   01       02200          LDA     #1      SET SIGNI TO NONE
48CC B7   4776     02210          STA     SIGNI   SIGNIFICANCE FLAG
48CF CC   0000     02220          LDD     #0      INITIALIZE MS BYTE
48D2 34   40       02230 DIV010   PSHS    U         SAVE MPV ADDRESS
48D4 8D   2C       02240          BSR     SHIFT     SHIFT MPV
48D6 35   40       02250          PULS    U         RESTORE ADDRESS
48D8 59            02260          ROLB              LAST BIT TO D
48D9 49            02270          ROLA              HIGH-ORDER BYTE
48DA 25   06       02280          BCS     OP2       GO IF HIGH-ORDER BIT
48DC 1083 0000     02290 OP1      CMPD    #0        DUMMY-TEST DIVISOR
48E0 25   08       02300          BLO     DIV020    GO IF NO GO
48E2 83   0000     02310 OP2      SUBD    #0        DUMMY-SUBTRACT DIVISOR
48E5 6C   5F       02320          INC     -1,U      SET Q=1
48E7 7F   4776     02330          CLR     SIGNI     SET SIGNIFICANCE
48EA 31   3F       02340 DIV020   LEAY    -1,Y      DECREMENT # BITS
48EC 26   E4       02350          BNE     DIV010    GO IF MORE
48EE 39            02360          RTS             RETURN
                   02370 **************************************
                   02380 * MULTIPLE-PRECISION ADD OR SUBTRACT *
                   02390 * ENTRY: BYTES=SIZE OF MPV IN BYTES  *
```

After the second set of data has been processed, the program converts SUM (the screen) to ASCII. In doing so, it successively divides SUM by 10, making SUM smaller and smaller. When this happens, you'll see a blank portion in the data area growing and snaking through the data area as more and more leading zeros are produced in SUM. When SUM is reduced down to zero, the ASCII digits are printed from the temporary ASCII buffer.

How Fast is *PI* and How does the CoCo Compare to Other Systems?

PI is a fairly efficient program, but it's obvious that our CoCo is no Cray X-MP! It takes about three hours to generate and print 500 decimal digits and about 23 hours for 1,000 digits (see Figure 7). Mainframe computers typically generate thousands of digits of pi in six to eight hours. For smaller MPVs, the speed drops dramatically and the screen is fun to watch. (As I write this, I'm running *PI* for 2,000 digits — estimated completion time is 240 hours.)

Could the *PI* program be sped up? Undoubtedly, both by more efficient code and by more efficient algorithms. This is a first attempt at the problem of generating pi and, frankly, it turned out to be an interesting project. It's one of those programming problems that simply can't be done in anything other than assembly language, where speed is all important. A perfect project for one of those silly hackers who can't think of anything but computers.

Well, it's 3 a.m. now, and I'm going to bed. Maybe tomorrow I can speed up the program again. Call me after I've caught up on my sleep if you think

Figure 7: *PI* to 1,000 Decimal Digits

```
31415926535897932384626433832795028841971693993751058209749445923078164062862089
9862803482534211706798214808651328230664709384460955058223172535940812848111745
02841027019385211055596446229489549303819644288109756659334461284756482337867831
65271201909145648566923460348610454326648213393607260249141273724587006606315588
17488152092096282925409171536436789259036001133053054882046652138414695194151160
94330572703657595919530921861173819326117931051185480744623799627495673518857527
2489122793818301194912983367336244065664308602139494639522473719070217986094370
27705392171762931767523846748184676694051320005681271452635608277857713427577896
0917363717872146844090122495343014654958537105079227968925892354201995611212902
19608640344181598136297747713099605187072113499999983729780499510597317328160963
18595024459455346908302642522308253344685035261931188171010003137838752886587533
20838142061717766914730359825349042875546873115956286388235378759375195778185778
05321712268066130019278766111959092164201989380952572010654858632788659361533818
27968230301952035187124
```

Last Few Digits Invalid

you've found a way to increase the program by a factor of two or three. Call me collect at any time if you can increase the speed tenfold!

Next time, we'll present more assembly language topics. ☐

```
                      02400 *          (U)=END OF DEST MPV+1       *
                      02410 *          (Y)=END OF SOURCE MPV+1     *
                      02420 *          (A)=$A9 IF ADD, $A2 IF SUB  *
                      02430 * EXIT:    DEST MPV-DEST MPV-SOURCE MPV*
                      02440 ****************************************
48EF B7    48F9       02450 ADDSUB  STA     OP3     SET MODE
48F2 1C    FE         02460         ANDCC   #$FE    RESET C
48F4 8E    0032       02470         LDX     #BYTES  GET # BYTES
48F7 A6    C2         02480 ADD010  LDA     ,-U       GET DEST BYTE
48F9 A9    A2         02490 OP3     ADCA    ,-Y       ADD OR SUB SOURCE
48FB A7    C4         02500         STA     ,U        DECREMENT AND STORE
48FD 30    1F         02510         LEAX    -1,X      DECREMENT COUNT
48FF 26    F6         02520         BNE     ADD010    GO IF NOT DONE
4901 39               02530         RTS             RETURN
                      02540 ****************************************
                      02550 * SHIFT MPV LEFT ONE BIT               *
                      02560 * ENTRY: BYTES=SIZE OF MPV IN BYTES    *
                      02570 *          (U)=END OF MPV+1            *
                      02580 * EXIT:    MPV<=MPV SHIFTED LEFT       *
                      02590 *          C=MSB                       *
                      02600 ****************************************
4902 1C    FE         02610 SHIFT   ANDCC   #$FE    RESET C
4904 8E    0032       02620         LDX     #BYTES  GET # BYTES
4907 69    C2         02630 SHI010  ROL     ,-U       SHIFT LEFT ONE BIT
4909 30    1F         02640         LEAX    -1,X      DECREMENT COUNT
490B 26    FA         02650         BNE     SHI010    GO IF NOT 0
490D 39               02660         RTS             RETURN
           0000       02670         END

00000 TOTAL ERRORS
```

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KISSable OS-9

Featuring a Trig Library in C

By Dale L. Puckett
Rainbow Contributing Editor

The column this month is short on prose — but long on listings. While we listen to the March winds blow and wait for the first hint of spring we feature a library of trig functions written in Microware C for the Color Computer. Several assembly language utility programs contributed by our readers round out the column.

We received a nice Christmas card from Hiro Sugawara at the Ark Corporation in Tokyo whom we met at Microware's OS-9 Seminar in Des Moines. With the card was the "OS-9 is No. 1!" logo he distributes in Japan. We print it here to share the international flavor of OS-9.

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Dale L. Puckett, who is author of The Official BASIC09 Tour Guide *and co-author, with Peter Dibble, of* The Official Rainbow Guide to OS-9, *is a free-lance writer and programmer. He serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. Dale works as a U.S. Coast Guard chief warrant officer and lives in Alexandria, Virginia.*

About Version 2.0

Before we jump into a short description of this month's contributions, we'll pass along a few news items that have crossed the desk during the past month. First, the Radio Shack catalog number for OS-9 Level 1, Version 2.00 is 700-2331. If you own OS-9 already, you may upgrade to the new version for $24.95. As we write this in early January, we still have not received our copy but we expect it any day. As soon as we get our hands on a disk we'll pass along our first impressions.

Third party vendors will most likely be scrambling also as they attempt to ensure that their products run properly on the new version. When we talked to Tandy we also learned they plan to ship a new 100-page computer catalog to their stores. Deborah McAlister, Tandy's public relations manager, told me we can expect to see at least 40 pages of software — including a list of some of the express order programs.

We have also received copies of *DeskMate* and *D. L. Logo* from Tandy. Both look great and the documentation really shines. Both manuals are written for users. This means that people who need to get a job done with their computer will be able to do it quickly without searching through several manuals full of technical details they don't need. I have heard that *DeskMate* is a big seller in the Washington, D. C. area, and one Coast Guard commander tells me he now uses it to keep all his household and investment records. I hope to be able to give you some first-hand observations soon.

I'm sure glad my December 1985 column hit the streets before *DeskMate*. It seems to have wiped out most of my wish list. Gerald Ross of Des Plaines, Illinois was quick to point that out. "Have you looked at *DeskMate*? It uses OS-9, and has a calendar, calculator, text editor, filing system and many other functions."

Other New Products

Computerware is now shipping a new advanced utilities package. The new KShell alone should be worth the price of the package. Written by OS-9 Users Group President Brian Lantz, it brings many of the features found in OS-9 68K's Shell Command Interpreter to the Color Computer and other 6809-based computers.

By the way, the Users Group now has a new address. If you need to contact them, write to 9743 University Avenue, Suite 330, Des Moines, IA 50322. The new mail forwarding service contracted by the group is doing a tremendous job, which means you should get a quick reply. Volume II, No. 1 of *MOTD*, the UG newsletter, was mailed and No. 2 should be in your hands by the time you read this. It sports a fantastic new typeset and two-color look courtesy of Kevin Quiggins, one of the talented design people at Falsoft, Inc.

The OS-9 Users Group also sponsored a buffet breakfast at RAINBOWfest-Palo Alto. Paul Searby of

Computerware was the keynote speaker. They also ran a booth in the exhibit hall.

The OS-9 Users Group has already sponsored three conferences on RAINBOW's Group CoCo on Delphi. These conferences are a lot of fun and give you a chance to talk directly to key figures from the OS-9 world. Brian Lantz hosted the first OS-9 conference shortly after Group CoCo opened, I hosted one in mid-December and Ken Kaplan, president of Microware, hosted another on January 26. Check out this quote from Kaplan!

"I can very strongly reassure you that OS-9 will probably be a big part of the next generation of personal computer systems. Your support and good taste in software will be richly rewarded."

Kaplan wouldn't talk about any of the new OS-9 68K ports but he offered a free OS-9 Software Vendor Catalog to anyone who calls Microware at (515) 224-1929. If you want to hear Ken Kaplan in person, join us at RAINBOWfest-Chicago, May 23-25, where he will be the keynote speaker at our OS-9 Users Group Breakfast on Sunday morning.

Additions to the QT Plus

Frank Hogg at FHL has found a way to fit five additional ports in the QT Plus. The add-on board, in final design at FHL as I write this, features four programmable serial ports, one parallel port and a battery backed up real-time clock. The board is being designed so that three could be hooked up to the QT Plus, although only one will fit in the present case. The new ports will support SYNC as well as ASYNC. The cost will be under $500. This means that a full blown QT Plus with a megabyte of RAM and eight ports will cost about $4,400 or about $550 per user!

FHL is also busy designing a new QT computer that will support up to 20 users. Based on the 68020 CPU, the new system will feature four, 12, and 20 port configurations with two megabytes of RAM. The system will have the look of the original QT but will be larger and hold more drives. Without telling anyone, FHL also has been preparing some new software that will be shipped with all QTs sold. "We're going to ship this package free to all present QT owners as a belated Christmas present," Hogg said.

The package has a value in excess of $2,000 and includes: *QCom*, a communications program with XMODEM upload and download; *fbu*, a hard disk to floppy backup program designed for the novice user; the *Sculptor Plus* run time package; and the *FHL Office System*. QT owners will be able to purchase the *Sculptor Plus* development system for $695, which is $300 off the regular price of $995. The 68K version of *DynaStar* should also be available by the time you read this. Written in C, this new version is very fast. The price is $400 for both *DynaStar* and *DynaForm*. They are not sold separately. And if you want a computer that will write programs for you automatically, check out *Sculptor Plus*. It is available now for 6809 OS-9. If you have the older version you may upgrade to the Plus for $175. The price is $995.

Back on the OS-9 68K front, we learned that independent vendors are porting OS-9 to both the Atari ST-512 and Commodore Amiga. These new ports follow two special 68000 boards that let you run OS-9 on the IBM PC, AT and XT. Our world is growing!

We received a letter from Dragon

BASIC COMPILER

WASATCHWARE believes that users of the Color Computer deserve the right to use all 64k of RAM that is available in the computer, and have fast machine language programs that use the full potential of the 6809 microprocessor. That is why the BASIC compiler, called MLBASIC was developed. Here are some of the reasons that make this compiler one of the best bargains in this magazine:

- Programs can use all 64k of RAM for either program storage or for large numbers of variables and arrays like A(20000)
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COMMANDS SUPPORTED

```
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   DSKO$   FIELD   FILES   GET     INPUT   KILL
   LSET    OPEN    PRINT   PUT     RSET

2. Program Control Commands
   CALL    END     EXEC    FOR     STEP    NEXT
   GOSUB   GOTO    IF      THEN    ELSE    ERROR
   ON..GO  RETURN  STOP    SUBROUTINE

3. Math Functions
   ABS     ASC     ATN     COS     CVN     EOF
   EXP     FIX     INSTR   INT     LEN     LOG
   LOC     LOF     PEEK    POINT   PPOINT  RND
   SGN     SIN     SQR     TAN     TIMER   VAL

4. String Functions
   CHR$    INKEY$  LEFT$   MID$    MKN$    RIGHT$
   STR$    STRING$

5. Graphic/Sound Commands
   COLOR   CLS     CIRCLE  DRAW    LINE    PAINT
   PCLEAR  PCLS    PLAY    PMODE   PRESET  PSET
   RESET   SCREEN  SET     SOUND

6. Other/Special Commands
   DATA    DIM     LLIST   MOTOR   POKE    READ
   REM     RESTORE RUN     TAB     VERIFY  DLD
   DST     IBSHFT  LREG    PCOPY   PMODD   PTV
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owner Lionel Peters, 40 Berkeley Road, Kinsbury, London NW9. He and Robin Hamilton are forming an OS-9 Users Group in England. They have successfully transferred much of the National OS-9 Users Group Software Library to the Dragon format and both promise to answer any questions from Dragon Users. "We have been starved of programs in the UK but there have been three exhibitions for 6809 machines in London. All of them have been very well attended, but most of the exhibitors have been selling games in BASIC and machine code."

June 1985 Correction

Darrell L. Hunter of Dayton, Ohio, spotted several missing lines in our listing of *elapsed* in the June issue. The changes begin after the thirteenth line. Here is the original and corrected version. Also note that Line 30 should read "fm:=fm-1" instead of "fh=fm-1."

Original

```
IF sf="S" THEN
f=DATE$
END
ELSE
 PRINT "Wrong Input Parameter:"
 PRINT "Use S(tart) or F(inish)"
 END
ENDIF
```

Corrected

```
IF sf="S" THEN
 s=DATE$
 END
ELSE
 IF sf="F" THEN
 f=DATE$
ELSE
 PRINT "Wrong input parameters:"
 PRINT "Use S(tart) or F(inish)"
 END
ENDIF
```

Trig Library

Our major feature this month was contributed by Jose R. Lebron of Rio Piedras, Puerto Rico. The Trig Library he shares was written by his good friend Al Buist, who placed it in the public domain before he passed away last year. Each function is presented as an individual listing. Note that Listing 14 contains a header file, *trigcons.h*, that is used by several of the functions. It should be stored in the DEFS directory on drive /d1 if you have set your Color Computer C Compiler up in the standard manner. Listing 15, *tstcos.c*, is a short test program that tests the function "sincos." You can use it as a model

Listing 1: *dabs*

```
/* dabs(x) - absolute value of a real number.
             Argument x must be a double.
*/
double dabs(x) /* compute absolute value of a real number */
double x;
{
   if ( x < 0.0 )
      x = -x;
   return(x);
}
```

Listing 2: *nlog*

```
/* nlog(x) - natural logarithm of a real number.
             Argument, x, must be of type double.
             The value returned is of type double.
*/
#define ENLOGVAL 44 /* x <= 0 */
#define INDEX     9 /* number of precalculated constants
                       for the nlog(x) power series */
#define LN2       6.931471805599453e-01
#define R21       4.761904761904762e-02
#define LN1_4375 3.629054936893685e-01

double nlog(x)
double x;
{
   union {
      double a;
      char c[8];
   } z;
   double x2,ln;
   static double r[INDEX] = { 3.333333333333333e-01,
                              2.000000000000000e-01,
                              1.428571428571429e-01,
                              1.111111111111111e-01,
                              9.090909090909091e-02,
                              7.692307692307692e-02,
                              6.666666666666667e-02,
                              5.882352941176471e-02,
                              5.263157894736842e-02 };

   register int n;
   int exp;
   extern int errno;

/* check for argument error */
   if ( x <= 0.0 ) {
      for ( n = 0; n < 8; ++n )
         z.c[n] = 0xff;
      errno = ENLOGVAL;
      return(z.a);
   }
/* check for values which are obvious */
   if ( x == 1.0 )
      return(0.0);
/* reduce to range 0.5<=x<1.0, save power of 2 to adjust */
   z.a = x;
   exp = ( z.c[7] & 0xff ) - 0x80;
   z.c[7] = 0x80;
/* calculate nlog(x) */
   if ( z.a == 0.5 )    /* bypass obvious value */
      ln = -LN2;
   else {               /* compute power series */
      z.a *= 1.4375;    /* shift range to relax the serie */
      x = ( z.a - 1.0 ) / ( z.a + 1.0 );
      x2 = x * x;
      ln = x2 * R21;
      for ( n = INDEX - 1; n >= 0; --n )
         ln = ( ln + r[n] ) * x2;
      ln = ( ln + 1.0 ) * x;
      ln += ln - LN1_4375;
   }
   return(ln+exp*LN2);
}
```

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The QT series:

The basic *QT* has 128K RAM, 68008 CPU, 8 Mhz and will support 4 users and 2 printer ports. The single floppy version is priced at $ 1,595 (Retail $ 2,095) and is field upgradeable to 512K RAM and 20 Meg hard drive. This system sells for $ 2,995 (Retail $ 3,595).

The QT Plus series:

This *QT* has 512K RAM, 68000 CPU, 10 Mhz and supports 4 users and 2 printer ports. The single floppy version is priced at $ 2,095 (Retail $ 2,695) and is field upgradeable to 1024K, 8 serial ports and hard disk. The *QT Plus* 4 user system with 512K RAM and 20 Meg hard drive is priced at $ 3,495 (Retail $ 3,995). The 512K upgrade costs $ 395 (Retail $ 495).

The QT 20 series:

This *QT* has 2048K RAM, 68020 CPU, 12.5 Mhz and supports 4 users and 1 printer port. This system can be expanded to 20 users with 16.67 Mhz. The *QT 20* with a 20 Meg hard drive sells for $ 7,495 (Retail $ 8,795).

QT Price List 1986

CONFIG.	DIRECT	RETAIL
QT 1 Drive	$1,595	$2,095
QT 2 Drives	$1,750	$2,295
QT 20 Meg HD	$2,995	$3,595
QT+ 1 Drive	$2,095	$2,695
QT+ 2 Drives	$2,250	$2,895
QT+ 20 Meg HD	$3,495	$3,995
QT 20 20 Meg HD	$7,495	$8,795

OS9/68000 SOFTWARE
Available Now

Sculptor	$995 (*$695 for QT owners*)
Microware C	$400
Microware Pascal	$400

Add 3.50 Shipping

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for programs to test the other functions. Here is a description of the functions presented.

dabs(x)	— computes the absolute value of a real number
nlog(x)	— computes the natural logarithm of a real number
dint(x)	— returns the integer, floor, of a real number
dfix(x)	— returns the integer part of a real number
sin(x)	— returns the sine of a real number
dsign(x)	— returns the sign of a real number
arctan(x)	— returns the angle whose tangent is 'x'
sqrt(x)	— returns the square root of a real number
reduce(&a,x)	— reduce an angle to the first revolution
dsqr(x)	— returns the square of a real number
sincos(x)	— computes the sine/cosine series
cos(x)	— returns the cosine of a real number
exp(x)	— returns the exponential function of a real number

Two Handy Assembly Language Utilities

Stephen Goldberg of Bethpage, New York, who made the "dollar per utility" offer on the *Utilipak* utilities in the February 1986 column, is back again with two assembly language listings we hope you will find useful. "I saw these utilities advertised in a package from Frank Hogg, but didn't need the rest of the programs, so I decided to try to write them myself," Goldberg said.

UnLoad (Listing 17) gives you a way to unlink a module or group of modules by typing a single command line. Unlike the *UnLink* utility in the standard OS-9 utility command set, *UnLoad* ensures the modules are removed. It gets the job done by repeatedly calling the OS-9 f$unlink system call — up to 25 times — until the system returns an error.

Goldberg's other listing, *Rep* (Listing 16), is really handy because it lets you execute OS-9 utilities designed for single variables repeatedly by taking its input from the standard input path. For example:

```
OS9: d ! rep list $ *.c >/p
```

Listing 3: *dint*

```
/* dint(x) - integer, floor, of a real number.
             Argument x must be a double.
*/
double dint(x)
double x;
{
   double a,dfix();

   a = dfix(x);
   if ( ( x < 0.0 ) && ( a != x ) )
      a -= 1.0;
   return(a);
}
```

Listing 4: *dfix*

```
/* dfix(x) - integer portion of a real number.
             Argument must be a double.
*/
double dfix(x)
double x;
{
   union {
      double a;
      char c[8];
   } z;
   register int n;
   int exp,mask=0xff;

   z.a = x;
   exp = ( z.c[7] & 0xff ) - 0x80;
   if ( exp >= 56 )
      return(x);
   if ( exp <= 0 )
      return(0.0);
   for ( n = 48; n > exp; n -= 8 )
      z.c[n>>3] = 0;
   for ( n += 8; n > exp; --n )
      mask <<= 1;
   z.c[n>>3] &= mask;
   return(z.a);
}
```

Listing 5: *sin*

```
/* sin(x) - sine of a real number.
            Argument must be double.
            Argument must be in radians.
*/

#include <trigcons.h>

double sin(x)
double x;
{
   double _sincos();

   reduce(&x,TWO_PI);
   return(_sincos(x));
}
```

Listing 6: *dsign*

```
/* dsign(x) - sign of a real number.
              Argument x must be double.
              -1.0 is returned if x is negative.
               1.0 is returned if x is positive.
               0.0 is returned if x is zero.
*/
double dsign(x)
double x;
{
   if ( x == 0.0 )
      return(x);
   if ( x < 0.0 )
      return(-1.0);
   return(1.0);
}
```

THE *SCULPTOR* SYSTEM

Sculptor combines a powerful fourth generation langauge with an efficient database management system. Programmers currently using traditional languages such as Basic and Cobol will be amazed at what *Sculptor* does to their productivity. With *Sculptor* you'll find that what used to take a week can be achieved in just a few hours.

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Sculptor is available on many different machines and for most operating systems, including OS9 6809 Level II and OS9/68000, MS DOS, Unix/Xenix and VMS. The extensive list of supported hardware ranges from small personal computers, through multi-user micros like the ***QT***, up to large minis and mainframes. *Sculptor* is constantly being ported to new systems.

APPLICATION PORTABILITY

Mobility of software between different environments is one of *Sculptor's* major advantages. You can develop applications on a stand-alone PC or the new Level II CoCo and - without any alterations to the programs - run them on a large multi-user system like the QT. For software writers this means that their products can reach a wider marketplace than ever before.

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THE BOTTOM LINE

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NOTE: New Level II CoCo Owners: At this writing the new CoCo does not exist, however we are of the opinion that *Sculptor* will run on this new machine. Call us after it does exist for confirmation of *Sculptor* operation.

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This command line will pipe a listing of all files — one per line — in the current data directory into the OS-9 list utility. Each time 'd' sends out a line to standard output, it appears as the standard input to "list." OS-9 then routes the standard output from "list" to the printer. Since *Rep* takes its input from the standard input path, it may be driven from the keyboard, a file or a pipe.

In the course of writing *Rep*, Goldberg discovered a bug in the documentation of the Fork and Chain system calls in the Color Computer OS-9 manuals. When you make these calls, the 6809 Y-register must contain the parameter size in bytes. The manual says pages. Beware!

Computers are more fun when they make noises. Sometimes. Now, thanks to Fred Sawtelle of Huntsville, Texas, you can make your Color Computer beep and scream. The three possible command lines are:

```
OS9: snd    (ENTER)
OS9: snd u  (ENTER)
OS9: snd d  (ENTER)
```

The first line will simply generate a short beep. The second produces a sound with a rising pitch. The third gives you a sound with a falling pitch. Since you'll probably want the sound generated instantly, you will probably want to leave the module loaded in memory. If you do this, you won't have to wait for it to load from your current execution directory each time you run it.

Next Month

In May we'll have another special treat for C programmers. I spoke with Frank Malaney, author of the shareware program *PrintForm* we mentioned in the February 1986 column, and he has agreed to let us publish it in "KISSable OS-9." It is an excellent example of a real application program in C. He also gave me some tips that will help you speed up your C program compiles. If you can't wait, you can get this shareware from Frank for $15 at 8708 Mink St., SW, Pataskala, OH 43062. He'll send you the source code, the compiled object code and a 28-page manual — on the disk.

We'll also take a look at an interesting Winchester disk project being completed by Alan Reinhart in Royersford, Pennsylvania, and a few more short, beginners' C programs from Dennis J. Duke in Bessemer, Alabama. ☐

Listing 7: *arctan*

```
/* arctan(x) - angle, in radians, whose tangent is x.
               Argument, x, must be of type double.
               The value returned is of type double.
               The value returned range is:
                  -pi/2 <= arctan(x) <= pi/2.
*/
#define INDEX     12   /* table size for power serie calculation */
#define F27       -3.703703703704e-02

#include <trigcons.h>

double arctan(x)
double x;
{
   double a, r = 0.0, x2, dabs();
   register int n;
   int s = 0;
   static double f[INDEX] = { -3.333333333333333e-01,
                               2.000000000000000e-01,
                              -1.428571428571429e-01,
                               1.111111111111111e-01,
                              -9.090909090909091e-02,
                               7.692307692307692e-02,
                              -6.666666666666667e-02,
                               5.882352941176471e-02,
                              -5.263157894736842e-02,
                               4.761904761904762e-02,
                              -4.347826086956522e-02,
                               4.000000000000000e-02 };

/* determine sign of result */
   if ( x < 0.0 ) {
      x = -x;
      s = -1;
   } else if ( x > 0.0 )
      s = 1;
/* if angle > pi/4, calculate arcot(x) serie */
   if ( x > 1.0 ) {
      x = 1.0 / x;
      r = -HALF_PI;
      s = -s;
   }
/* relax the serie to accelarate convergence */
   if ( x > TAN15 ) {
      x = ( SQRT3 * x - 1.0 ) / ( x + SQRT3 );
      r += SIXTH_PI;
   }
/* calculate arctan(x) */
   if ( dabs(x) <= 1.0e-09 )     /* check for very small values */
      a = x;
   else {                        /* compute power serie */
      x2 = x * x;
      a = x2 * F27;
      for ( n = INDEX - 1; n >= 0; --n )
         a = ( a + f[n] ) * x2;
      a = ( a + 1.0 ) * x;
   }
   a += r;
   if ( s == -1 )
      a = -a;
   return(a);
}
```

Listing 8: *sqrt*

```
/* sqrt(x) - square root of a real number.
             Argument x must be a double.
*/
#define SOLVE 1
#define FALSE 0
#define TRUE  1
#define ESQRTNEG 43   /* negative argument for sqrt */

double sqrt(x) /* compute the square root of x */
double x;
{
   double b,dabs();
   union {
      double a;
      char c[8];
   } x0;
```

DynaStar

DynaStar is our most popular word processor for OS9. *DynaStar* works with O-Pak and WordPak I and II. *DynaStar* will also work with Level II OS9, which means that an upgrade will be available for the new CoCo that runs Level II OS9. ***DynaForm***, the text formatting part of *DynaStar* has *Mail-Merge*, an extra cost option on other word processors.
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```
   int err = FALSE;
   extern int errno;

   if ( x == 0.0 )
      return(x);
   if ( x < 0.0 ) {
      err = TRUE;
      x = -x;
      errno = ESQRTNEG;
   }
   x0.a = x;   /* set initial approximation */
   x0.c[7] = ( ( x0.c[7] >> 1 ) & 0x7f ) + 64;
   b = x / x0.a;
   do {
      x0.a = ( x0.a + b ) * 0.5;
      b = x / x0.a;
      if (dabs( x0.a - b ) < ( 0.5e-16 * b ))
         break;
   } while ( SOLVE );
   if ( err )
      x0.a = -x0.a;
   return(x0.a);
}
```

Listing 9: *reduce*

```
/* reduce(&a,r) - reduce angle to first revolution.
                  &a - address of a double variable
                       containing the angle.
                   r - size of a revolution.
                  The angle and the size of a revolution
                  must conform in units, i.e., rads, etc.
*/
reduce(a,r)
double *a,r;
{
   double dfix();

   *a /= r;
   *a -= dfix(*a);
}
```

Listing 10: *dsqr*

```
/* dsqr(x) - square of a real number.
             Argument x must be double.
*/
double dsqr(x)
double x;
{
   return(x*x);
}
```

Listing 11: *sincos*

```
/* sincos(x) - calculate the sine/cosine series.
               This function is internal to sin(x)/cos(x),
               but can be used by routines in other files.
*/
#define INDEX    18   /* size of table for power series */
#include <trigcons.h>

double _sincos(x)
double x;
{
   static double f[INDEX] = {  TWO_PI,
                              -1.973920880217872e+01,
                              -4.134170224039976e+01,
                               6.493939402266829e+01,
                               8.160524927607504e+01,
                              -8.545681720669372e+01,
                              -7.670585975306138e+01,
                               6.024464137187665e+01,
                               4.205869394489764e+01,
                              -2.642625678337439e+01,
                              -1.509464257682299e+01,
                               7.903536371318467e+00,
                               3.819952584848281e+00,
                              -1.714390711088672e+00,
                              -7.181223017785003e-01,
                               2.820059684557911e-01,
                               1.042291622081398e-01,
                              -3.638284114254566e-02 };
    double s,x0,x2;
    register int n;
    int l,q;

 /* reduce to the first revolution */
    while ( x > 1.0 )
       x -= 1.0;
    while ( x < 0.0 )
       x += 1.0;
 /* check for values which are obvious */
    if ( ( x == 0.0 ) || ( x == 0.5 ) || ( x == 1.0 ) )
       return(0.0);
 /* reduce to the first quadrant */
    if ( x > 0.5 ) { /* set sign of result */
       q = -1;
       x = 1.0 - x;
     } else
       q = 1;
    if ( x > 0.25 )
       x = 0.5 - x;
 /* check for other obvious values */
    if ( x == 0.25 ) /* PI/2 */
       return(q);
 /* reduce to range 0 -> PI/4 */
    if ( x < 0.125 ) { /* set for sine series */
       n = INDEX - 2;
       l = 0;
    } else {            /* set for cosine series */
       n = INDEX - 1;
       l = 1;
       x = 0.25 - x;   /* PI/2 - x */
    }
 /* calculate sin(x) or cos(PI/2-x) series */
    if ( x > 1.0e-09 ) {
       x2 = x * x;
```

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```
        if ( 1 )
            x0 = x2;
        else
            x0 = x;
        s = f[n] * x2;
        for ( n -= 2; n > 1; n -=2 )
            s = ( s + f[n] ) * x2;
        s = ( s + f[n] ) * x0 + 1;
    } else
        if ( 1 )
            s = 1.0;
        else
            s = x * f[0];
/* return the sine of the angle */
    if ( q < 0 )    /* set sign of result */
        s = -s;
    return(s);
}
```

Listing 12: *cos*

```
/* cos(x) - cosine of a real number.
            Argument x must be double.
            Argument x is in radians.
*/

#include <trigcons.h>

double cos(x)
double x;
{
    double _sincos();

    reduce(&x,TWO_PI);
    return(_sincos(0.25-x));
}
```

Listing 13: *exp*

```
/* exp(x) - exponential function of a real number.
            The argument, x, must be of type double.
            The function value returned is of type double.
            If x<-88, the function returns zero(0.0).
            If x>88, the function returns the largest number.
*/
#define INDEX    15  /* number of factors for power serie */
#define LN2       6.931471805599453e-01
#define LOG2E     1.442695040888963
#define F17      -2.811457254345521e-15
#define E         2.718281828459045
#define E_I       3.678794411714423e-01

double exp(x)
double x;
{
    static double f[INDEX] = {  5.000000000000000e-01,
                               -1.666666666666667e-01,
                                4.166666666666667e-02,
                               -8.333333333333333e-03,
                                1.388888888888889e-03,
                               -1.984126984126984e-04,
                                2.480158730158730e-05,
                               -2.755731922398589e-06,
                                2.755731922398589e-07,
                               -2.505210838544172e-08,
                                2.087675698786810e-09,
                               -1.605904383682161e-10,
                                1.147074559772972e-11,
                               -7.647163731819816e-13,
                                4.779477332387385e-14 };

    union {
        double e;
        char c[8];
    } z;
    double dint();
    register int n;
    int m;

/* check for obvious values */
    if ( x == 0.0 )
        return(1.0);
    if ( x == 1.0 )
        return(E);
    if ( x == -1.0 )
        return(E_I);
```

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```
/* check for range of argument */
   if ( x > 88.0 ) {             /* return largest value */
      for ( n = 1; n < 8; ++n )
         z.c[n] = 0xff;
      z.c[0] = 0x7f;
      return(z.e);
   } else
   if ( x < -88.0 )
      return(0.0);
/* reduce range of x and save exponent for adjustment */
   m = dint(x*LOG2E) + 1;
   x = -x + m * LN2;
/* calculate exponential function */
   if ( x < 1.0e-09 )         /* check for very small values */
      z.e = 1.0 - x;
   else {                        /* compute power serie */
      z.e = x * F17;
      for ( n = INDEX - 1; n >= 0; --n )
         z.e = ( z.e + f[n] ) * x;
      z.e = ( z.e - 1.0 ) * x + 1.0;
   }
   z.c[7] += m;                  /* adjust exponent */
   return(z.e);                  /* return exp(x) */
}
```

Listing 14: *trigcons.h*

```
#define PI         3.141592653589793
#define TWO_PI     6.283185307179586
#define TWO_PI_I 1.591549430918953e-01   /* 1/2pi */
#define HALF_PI    1.570796326794897        /* pi/2 */
#define SIXTH_PI 5.235987755982989e-01   /* pi/6 */
#define TAN15      2.679491924311227e-01   /* tan(pl/12) */
#define SQRT3      1.732050807568877        /* sqrt(3) */
#define D_TO_RAD 1.745329251994330e-02   /* pi/180 */
#define RAD_TO_D 5.729577951308232e+01   /* 180/pi */
#define D_REV      360.0 /* degrees in one revolution */
#define G_REV      400.0 /* grads in one revolution */
```

Listing 15: *tstcos.c*

```
#define TRUE 1
#include <trigcons.h>

main()
{
   double x,_sincos();

   pffinit();
   while (TRUE) {
      scanf("%F",&x);
      reduce(&x,D_REV);
      printf("%.15e\n",_sincos(x+0.25));
      printf("%.15e\n",_sincos(0.25-x));
      printf("%.15e\n",_sincos(x));
   }
}
```

Listing 16: *Rep*

```
************************************************************
*
* REP  -  COPYRIGHT (c) 1985 by S.B.GOLDBERG
*
* Permits repetitive execution of utilities written for
* single variables.  Variables are accepted from the
* standard input path (keyboard, pipeline or redirection)
* and replace '$' in command line.
*
* EXAMPLES:
*         d!rep copy $ /dl/backup/$
*     Copies all files in the current data directory to
*     the directory 'BACKUP' on drive /Dl.
*
*         rep ident $ <textfile
*     Displays ident for all filenames listed in 'textfile'.
*
*         rep attr $ -pr
*     Removes the 'public read' attribute from all filenames
*     entered from the keyboard.  Make no entry and press
*     <ENTER> when finished.
*
         ifpl
         use    /d0/defs/os9defs
         endc
*
         mod    len,name,prgrm+objct,reent+l,entry,dsiz
*
params   rmb    200    module parameters
modaddr  rmb    2    address of module name
pramaddr rmb    2    address of parameters
head     rmb    2    module header address
varble   rmb    100    input buffer
         rmb    200    stack
         rmb    200    'rep' parameters
dsiz     equ
*
name     fcs    /rep/
         fcc    /(c) 1985 S.B.GOLDBERG/
*
entry    stx    modaddr   save address of module name
************************************
*
* LOAD MODULE
*
         clra    any type or language
         pshs    u    save U register
         os9     f$load    load module
         bcs     out    exit with error
         stu     head    save header address
         puls    u    retrieve U register
         stx     pramaddr    save address of module parameter
************************************
*
* READ VARIABLE FROM STANDARD INPUT PATH
*
getvar   clra    standard input path
         ldy     #100    maximum variable length
         leax    varble,u    variable buffer address
         os9     i$readln    read variable
         bcs     error    branch on error
         cmpy    #1    <ENTER>?
         beq     noerr    yes, terminate 'rep'
************************************
*
* CREATE MODULE PARAMETERS
*
         tfr     u,x    address of parameter buffer
         ldy     pramaddr    address of parameters
loop     lda     ,y+    get param. character
         cmpa    #'$    dollar sign?
         beq     putvar    yes, set variable
         sta     ,x+    no, save in parameter buffer
         cmpa    #$0d    end of line?
         beq     doit    yes, execute the module
         bra     loop    no, get next character
putvar   pshs    y    save Y register
         leay    varble,u    variable buffer address
varloop  lda     ,y+    get variable character
         cmpa    #$0d    done?
```

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```
         beq    home   yes, go back to parameter copy
         sta    ,x+   no, save in parameter buffer
         bra    varloop   get next character
home     puls   y   retrieve Y register
         bra    loop   go back to param. copy
**********************************
*
* EXECUTE THE MODULE
*
doit     ldd    #$0001   any type or lang.; default data size
         ldx    modaddr   address of module name
         ldy    #200   maximum parameter length
         os9    f$fork   execute the module
         bcs    unlink   exit with error
         os9    f$wait   wait for module to finish
         tstb   module pass an error?
         beq    getvar   no, get next input
**********************************
*
* EXIT 'REP'
*
error    cmpb   #e$eof   end of the input file?
         bne    unlink   no,  exit with error
noerr    clrb   yes, clear error flag
unlink   ldu    head   get header address
         os9    f$unlink   unlink module
out      os9    f$exit   quit 'rep'
         emod
len      equ    *
         end
```

Listing 17: *UnLoad*

```
**********************************************************
*
* UNLOAD  -  COPYRIGHT (c) 1985 by S. B. GOLDBERG
*
* Use: unload <module.name> [...]
*
* Repeatedly unlinks the listed module(s) to delete
* them from memory.
*
         ifpl
         use    /d0/defs/os9defs
         endc
*
         mod    len,name,prgrm+objct,reent+1,entry,dsiz
*
count    rmb    1   number of tries
         rmb    200   stack
         rmb    200   params
dsiz     equ    .
*
name     fcs    /unload/
         fcc    /(c) 1985 S.B.GOLDBERG/
*
entry    lda    #25   loop count
         sta    count   save count
         clra   any type or language
         os9    f$link   link module to get header address
         bcs    out   exit with error
loop     os9    f$unlink   unlink module
         bcs    out   exit with error
         dec    count   25 times?
         bne    loop   no, unlink again
next     lda    ,x   yes, look for more names
         cmpa   #$0d   another module?
         bne    entry   yes, unlink it
         clrb   no, clear error flag
out      os9    f$exit   quit unload
         emod
len      equ    *
         end
```

Listing 18: *Sound*

```
 nam snd
 ttl 3 hard-coded sounds from one module

********************************
* Options:  u, d
*
*      no option = short beep
*      u  option = rising pitch
*      d  option = falling pitch

 ifpl
 use /d0/defs/os9defs
 endc

skip2 equ $8c
typ set prgrm+objct
rev set reent+1
 mod zz,mn,typ,rev,go,edat

 rmb 200
edat equ .
mn fcs "snd"
 fcb 1 (version)

go lda ,x
 anda #$df
 cmpa #'U
 beq upsnd
 cmpa #'D
 beq dnsnd
beep ldd #$d080
 bra snd1
upsnd ldd #$100
 fcb skip2
dnsnd clra
 clrb
snd1 pshs d
 ldx #$ff22
 lda 1,x
 anda #$fb
 sta 1,x
 ldb ,x
 orb #2
 stb ,x
 ora #4
 sta 1,x
snd2 pshs a
 anda #2
 pshs a
 lda $ff22
 anda #$fd
 ora ,s+
 sta $ff22
 bsr delay
 lda ,s+
 inca
 bra snd2
delay lda 4,s
dl0 deca
 bne dl0
 tst 3,s
 beq dl2
 bmi dl3
dl1 dec 4,s
 bne back
sndout clrb
 os9 f$exit
dl2 inc 4,s
 beq sndout
back rts
dl3 inc 3,s
 beq sndout
 rts
 emod
zz equ *
 end
```

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Continued from Page 10

Editor:

The Alaska CoCo BBS offers online games to play and soon to come, two callers may play online games against each other. We support up/downloads and operate 24 hours a day, seven days a week. Call Voice (907) 344-0161, Data (907) 344-3748.

Dean Lawrence
Anchorage, AK

• CoCo Jet BBS is online 24 hours a day, seven days a week at (602) 969-8545 and is 300 Baud. CoCo Jet runs on a TRS-80 CoCo 2, two disk drives. If you want a password, you can send your real name and alias (if any), address, city, state, phone number, computer system and a six-character password to me at Applications Department, 641 N. Dawn Circle, 85203.

Dan Sobczak
Mesa, AZ

• The California Computer Federation announces the following BBSs.

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• The Colorama BBS of Waterford is a CoCo oriented system with online games, downloading and many other features. Runs 24 hours a day, seven days a week. Call (203) 442-8187.

Dee Ward
Waterford, CT

• We would like to announce the #6809EXPERIENCE# BBS. Our data line is (203) 236-0709, 24 hours, 300 Baud, 8-N-1 parity. The features we offer are what set us apart from many other BBSs. Give us a call.

John M. Pozzato
W. Hartford, CT

• I'm announcing a new newsletter dedicated to CoCo BBSs. It will feature a list of CoCo BBSs around the world. If you have a BBS, please send me your information. This newsletter will also feature advertisements on where to purchase modems, terminal programs, BBS programs and more. There will be a mail section for those who want to leave tips on Adventure games or anything else. To get this monthly newsletter, please send $2 plus your name and address to 301 Caravel Drive, 19701.

Steve Slack
Bear, DE

• Announcing the start of a chain of Eagles Nest BBSs. Eagles Nest headquarters is in N. Province, R.I. Call (401) 353-5034. Eagles Nest #2 is in Hollywood, Fla. Call (305) 981-8173. Eagles Nest #3 is in Memphis, Tenn. Call (901) 744-3478. All three boards run on a greatly modified Colorama 3.0 and run 24 hours a day.

Dan Schoenbaum
Hollywood, FL

• The Jax Online BBS has been in service for over two years, runs 24 hours a day, seven days a week, has 300/1200 Baud capabilities. This BBS utilizes 128K, eight disk drives, 300/1200 Baud. Data line is (904) 737-2258, voice line is (904) 737-3640.

Bill Dempsey
Jacksonville, FL

• I would like to announce the Brainchild BBS. The number is (404) 629-7197. We are online from 9 p.m.-6 a.m. seven days a week.

Carl England
Calhoun, GA

• The Evansville Connection BBS is alive and well at (812) 476-9453. We operate at 300 Baud, seven bits, even parity. The hours are 9 p.m. Fridays till 9 p.m. Sundays.

Brad Callahan
Evansville, IN

• I am happy to announce another Colorama BBS online 24 hours a day, seven days a week. Features include message base, online programs and games, downloading, screen pause and other well-known Colorama options. The communications protocol is 300 Baud, seven bit, even parity, one stop bit. Phone (317) 392-2769.

Duke Norris
Shelbyville, IN

• I would like to inform all RAINBOW readers of a new BBS, The Computer Cellar. It is run on a 64K CoCo 2 and two double-sided drives. The BBS supports XMODEM up/downloads, online games, a number database, modem-pal section and much more. The board runs 24 hours a day, seven days a week. Phone (319) 277-0646.

Kevin Langenwalter
Cedar Falls, IA

• I am pleased to announce the start of my BBS. The number is (502) 955-6184. We are a 24-hour BBS dedicated to the CoCo.

Claude Napier
Louisville, KY

• Fast Trackin' BBS is online and currently operating a 300 Baud with online storage exceeding 300K with four 40-track drives. Give us a call around the clock at (502) 365-7771.

David Guess
Princeton, KY

• A new BBS called The Asylum, 300/1200 Baud, runs 24 hours a day, seven days a week. Call (504) 886-3713.

Nolan Edward Lee
Sun, LA

• I would like to announce that a new BBS called CoCo Net is online 24 hours a day. The number is (504) 654-9298.

Dustin Maxfield
Zachary, LA

• I would like to announce a new BBS. It will be online 24 hours a day, seven days a week. The number is (617) 889-0777.

Robert Bohn
Chelsea, MA

• Benchboard BBS operates at 300 Baud, 8/N/1, 24 hours each day. Call (517) 394-2447. All long distance callers must mail a post card or letter with their name, address, phone number, type of computer and desired password (up to eight characters). Mail information to Benchboard, P.O. Box 278, 48842-0278.

John C. Evans, Jr.
Holt, MI

• I am pleased to announce that Kosciusko now has a BBS. The AMUG (Attala Micro Users Group) BBS is online after 6 p.m. (CST) Monday through Saturday and all day Sunday. Call (601) 289-5161.

William Duncan
Kosciusko, MS

• The Colorama CoCo Users Groups BBS runs 24 hours a day, seven days a week. Fully supports XMODEM, up/downloading, 300 Baud, no fee required. Call (314) 899-0611.

Carl Eberhardt
West Alton, MO

• Our club has put together a BBS. The number is (712) 258-0234. If anyone would like to leave me a message on the board, my initials are ABP.

Alan Pedersen
South Sioux City, NE

• I am pleased to announce that CCIE is now running TCBBS software. The Color Computer BBS is 100 percent machine language. Call (201) 725-5028. 300/1200 Baud. A note to those interested in running BBSs: TCBBS requires 64K, a multipack, and a hardware pack that includes a UART (RS-232 port), parallel printer port and a real-time clock. More information is available on the board.

Darren Nye
Manville, NJ

• Announcing two new BBSs in the New York area. Both are open 24 hours a day, both have many subboards. Call Switch-Board at (914) 429-5616, or Varsity BBS at (914) 693-8551.

Elliot Richman
Ardsley, NY

• Announcing the first (to my knowledge) public domain BBS system for the CoCo; it is the RS-BBS. It can be obtained through the RS-BBS H.Q., P.O. Box 901, 11710. To receive a copy just send three diskettes and $1 for postage and handling or $6 to cover the price of disks and postage and handling.

Call (516) 783-7506 24 hours a day, seven days a week.

Joseph Castelli
Bellmore, NY

• This is to inform you of a new BBS in Queens. We are part of the TELE-NET BBS network. We currently have six BBSs and are willing to recruit more. If you would like to join or need more information on the network, send an SASE to 75-04 60 Place, 11385. We currently operate at 300 Baud, a 64K CoCo 2, two disk drives operating at 6 ms. Call us at (718) 381-2209, 24 hours a day, seven days a week. We have up/downloading, message bases and more.

Mike Sileo, Jr.
Glendale, NY

• Colorama of Minot is online 24 hours a day supporting Tandy CoCo users in the area. Downloads, news, club news, message base, online games and more. Call (701) 839-7081.

Pete Fettig
Minot, ND

• Our BBS has about 300-400 Color Computer downloads, including OS-9 downloads. There is a $10 fee. It is a TBBS 1.3 system, running on a Model 4, one five meg hard drive, two double-sided 5¼-inch floppy drives and two single-sided 5¼ floppy drives. We offer many features and run 24 hours a day, seven days a week at 300/1200 Baud. Call (513) 984-8705.

Mike Kennedy
Cincinnati, OH

• The Tigers Den of Wetherford is now operating at 300/1200 Baud and is devoted to CoCo users and will be aimed at Adventures and war games, but all programs will be appreciated. Call (405) 772-7277 between 5-11 p.m.

David Miller
Wetherford, OK

• I would like to announce the existence of a Colorama BBS in Homer City. The BBS has message base, online games, magazine section, 24 download files, basement, advertising, hints and tips and much more. Online 24 hours a day at 300 Baud. Call (412) 479-3786.

Bruce Rummel
Homer City, PA

• I would like to announce the formation of a new BBS called The Glaxian. It has almost a meg of online storage and is inhabited by many different creatures. The number from any earth phone is (215) 752-9746. All computers and/or starships are welcome.

Jay Kellett
Langhorne, PA

• The Colorama BBS of Cookeville is open from 10 p.m. to 6 a.m., seven days a week. The BBS supports up/downloading, online games and much more. Call (615) 528-2864.

Pat Oakley
Cookeville, TN

• Another BBS is online 24 hours a day, 300 Baud unless used by the SysOp. Call (615) 496-3340. There is no fee but any donations are welcome. Send to Rt. 2, Box 1036, Mapleton Drive, 37311.

Brian S. Graham
Cleveland, TN

• I would like to take this opportunity to tell you about our new chain of BBSs. They run 24 hours a day, 300/1200 Baud. We have up/downloading, online games, very user friendly Colorama system. Call (901) 743-2763 or (401) 353-5034.

Jerry Maye
Memphis, TN

• Colorama BBS of Irving is now running. Call (214) 438-2412, 24 hours a day, seven days a week.

Terry Luthell
Irving, TX

• Call the Peninsula CoCo BBS at (804) 868-0922. We operate a CoBBS, the fastest growing CoCo BBS in the Tidewater area of Virginia.

Bill Satterwhite
Tabb, VA

• We have a reliable 24-hour BBS (Colorama) aimed at providing total support to users. Call (206) 435-4308.

Thomas B. Frey
Arlington, WA

• Announcing two BBSs in the valley. The first is at Skagit Valley Community College and runs 24 hours a day at (206) 428-1294. The second is a FIDO board and runs from 1800 to 0800 at (206) 757-5233.

Scott Honaker
Mount Vernon, WA

• I would like to announce Graphic Fantasy BBS is online Fridays 8 p.m. to Sunday 10 p.m. CST. It has up/downloads message base, online games and some great pictures in the download section. Call (414) 623-2496 between advertised hours.

Dennis Genz
Columbus, WI

• Announcing a new BBS in the Kenosha-Salem area called Uncle Dave's BBS. Operates at 300 Baud 24 hours a day, seven days a week. Supports up/downloading and various message bases. My address is 24607 67th Street, 53168.

David Buehn
Salem, WI

• Would you please inform your readers of the new BBS called The Hackers Palace. It uses the ring-back system. Call and let the phone ring only once and then call back in 50 seconds — I will flip the modem on. The hours are 9 a.m. to 9 p.m. Call (304) 287-2607.

Mark Richards
Carolina, WV

• I would like to announce the grand opening of yet another Colorama BBS in the Tilbury-Chatham area. Open 24 hours a day, seven days a week. For members that join, there is a newsletter once a month. The number is 682-1309.

Charlie Mizzi
Tilbury, Ontario

• The Le Club CoCo La Tuque Inc. has a BBS. Just leave a message at initial PMP. We operate 24 hours a day, seven days a week. The number is (819) 523-4329. Press ENTER when you get the link; it is in full French and the speed is 300 Baud.

Pierre Lortie
La Tuque, Quebec

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At last - The book exclusively for you and your CoCo !! You've learned BASIC and are now ready to learn assembly language programming. This hands-on guide begins with the basics and progresses to the expert level; revealing programming conventions and techniques and all the internal capabilities of the TDP-100, CoCo 1 and 2. At every step of the way are illustrations, sample programs, and plain English explanations. All sample programs are shown as assembled with Radio Shack's EDTASM+ cartridge. Plus, a complete chapter explains how to use all EDTASM+ capabilities. This book describes how to write subroutines, interrupt handlers, programs that control the graphics display modes, cassette, disk, keyboard, sound, joysticks, serial I/O, interrupts, and use of ROM resident subroutines. Not only is the MC6809E microprocessor described, but also the video display generator (VDG), peripheral interface adapters (PIA), and how they all work together. This book is suitable as a high school or college textbook.

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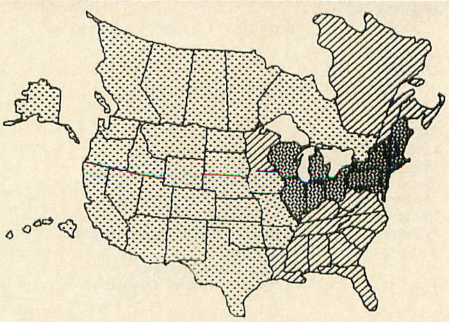

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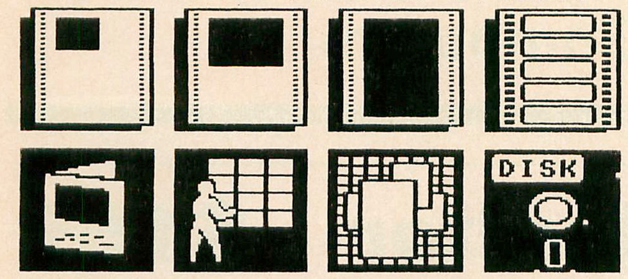

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- **1x, 2x, 3x PRINTOUTS** - Three menu options are reserved for the most frequently used printout sizes; 1x (quarter page), 2x (half page), and 3x (full page).
- **GRAPHIC LABELS** - The label printing option allows the user to create custom mailing or disk labels with professional looking results.
- **GREETING CARDS** - The greeting card option allows the user to custom design greeting cards using both text and graphics.
- **GIANT POSTERS** - The poster option provides the user with a means of reproducing a hi-res graphic to a multi-sheet poster.
- **SPECIAL EFFECTS** - The special effects option allows the user to directly control the printing directives; ROTATION, X/Y SIZE, X/Y FLIP, X/Y GRID, X/Y FILL, TAB, WINDOW, POS/NEG IMAGE, and more!
- **USER CALL** - Have an application that **HARDCOPY** doesn't quite match? **HARDCOPY** routines can be added to EXTENDED BASIC through the USR command!

HARDCOPY* requires a 64K Color Computer or Color Computer II, and at least one disk drive.It supports 1 to 4 disk drives, keyboard or joystick input. Please specify **printer** and **cat. number** when ordering.
* Due to hardware differences, some features may function differently on certain printers.

IDS 480/560-G	Cat. No. 170WD	Epson LX-80	Cat. No. 173WD	DMP-110	Cat. No. 180WD
Oki 82A (Okigraph)	Cat. No. 179WD	Epson MX-80	Cat. No. 172WD	DMP-120	Cat. No. 176WD
Okidata 92	Cat. No. 171WD	Epson RX-80	Cat. No. 173WD	DMP-130	Cat. No. 182WD
Gemini 10X	Cat. No. 174WD	Epson FX-80	Cat. No. 173WD	DMP-200	Cat. No. 176WD
Gemini SG-10/15	Cat. No. 178WD	Riteman PLUS	Cat. No. 177WD	CGP-220	Cat. No. 181WD

YOU COULD SPEND $100.00 OR MORE TO UPGRADE YOUR GRAPHICS SYSTEM, JUST BUY...

Eclipse (Zoom)	$19.95/Moreton Bay
Super Paint (Paint)	$19.95/Michtron
Shrinx (Reducer)	$21.95/Grafx
Text Master (Hi-Res Text)	$29.95/Data Man
G.C.U. (Disk Utilities)	$19.95/Computize

OR YOU COULD SPEND $24.95 FOR GRAPHICOM PART II AND GET:

a video processing package that provides many functions that are missing in Graphicom. Here are just a few of the features provided by Graphicom Part II:

ENLARGE/REDUCE/ROTATE
Enlarge or reduce any portion of a graphic screen, just like a photographic enlarger! Rotate by any degree or fraction of a degree around any point on the screen.

PAINT
Paint or "fill-in" any irregular area on the screen! More than 50 different colored patterns available. Additional paint patterns may be user-defined.

PAN & ZOOM
"Zoom in" x2, x4, or x8 on any portion of the screen to do fine pixel work. Allows editing of Graphicom character sets with ease!

TYPESETTER & FONT EDITOR
Add text in 16 different sizes, also supports user definable foreground & background colors. Design & Edit characters for use in the typesetter.

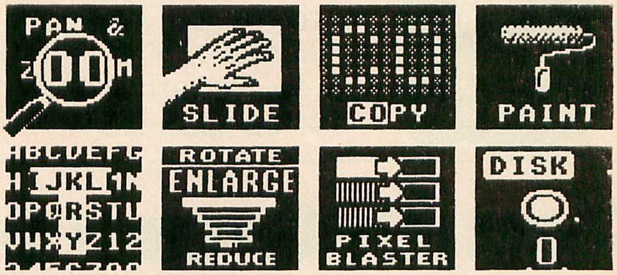
PIXEL BLASTER
Allows the user to easily substitute or remove colors. Widen lines, swap BLUE & RED without effecting BLACK & WHITE, etc.

GRAPHICOM PART II DOES NOT REQUIRE GRAPHICOM TO RUN!

Graphicom Part II requires a 64K extended disk basic system, and supports 1 to 4 disk drives, keyboard or joystick (analog or switch type) input. It will load and save both **Standard BIN** files and **Graphicom** screens. All functions support color or Hi-Res operation, as well as the 4 screen display modes.

GRAPHICOM PART II

DISTRIBUTED BY COMPUTIZE INC.



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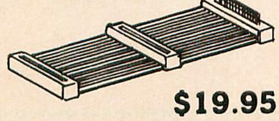
GRAPHICOM PART II $24.95

NEW LOW PRICE! GRAPHICOM DIGITIZER $159.00

Input directly into Graphicom for easy enhancements, manipulation, stamping, and storage. Accepts composite video signal in (1.0v p-p) from video camera, VCR, video disc player, another computer, or other compatible video sources. View "off air" or "VCR" digitized video at close to real-time. "Snapshot" video frames to the digitizer's internal memory. No slow, data serial manipulation.
Use with your multi-pak or a "Y" cable ("Y" cable available at $19.95)
Video is input via a "BNC" connector.
External controls for HORIZONTAL POSITION, VERTICAL POSITION, HORIZONTAL WIDTH, BRIGHTNESS, and CONTRAST (FUZZ) settings.
Don't be fooled by imitations...this is the GRAPHICOM VIDEO DIGITIZER . . . the **only** digitizer that "DIRECTLY" inputs into Graphicom
REQUIRES 64K COCO, 1 DISK DRIVE, AND 2 ANALOG JOYSTICKS. FREE GRAPHICOM PROGRAM, PICTURE DISK, AND GRAPHICOM UTILITY SUPPLIED WITH PURCHASE OF VIDEO DIGITIZER (A $50 VALUE).

"Y" CABLES



$19.95

GRAPHICOM $24.95

Catalog No. 111GD
Simply stated - One of the finest graphic programs written for the Color Computer!
FEATURES:

- S-U-P-E-R U-S-E-R F-R-I-E-N-D-L-Y !
- Supports 4 Hi-Res display modes
- 4 page animation mode
- Color Palette with over 15 color patterns for use with Hi-Res artifact
- Send/Receive pictures over modem
- Supplied utility allows capturing Hi-Res screens from most COCO arcade games
- Multiple Hi-Res character fonts (user redefinable)
- Supplied utility for transferring Graphicom screens to Basic or other M/L programs.
- Supplied utility for loading screens from Basic or other sources
- Built in Hi-Res SCREEN PRINT (compatible with EPSON, C-ITOH, GEMINI-10, OKI, plus Radio Shack's LP-VII, LP-VIII, DMP-100, DMP-200, and GCP-115 printers) from 110 to 9600 baud
- SEND/RECEIVE slow-scan television
- Many additional features, operating hints, hardware mod's and suggestions, etc.

REQUIRES 64K COCO, 1 DISK DRIVE, AND 2 ANALOG JOYSTICKS

NEW MASTER KEY II

New Improved Version! A hardware product that takes control of any program regardless of protection. Now use with RS Multi-pak, "Y" cable or **optional** extender cable. Captures register contants as they were when Master Key II was engaged. Complete disassembler, memory save, and much more. Requires some familiarity with Assembly Language.
ROM PAK Cat. No. 160HR . . . . $ 99.95
Cat. No. 161HR With Ext. Cable . . . $109.95

PICTURE DISK SETS

Available from COMPUTIZE
4C - Artifact color palette
5C - Large character sets (from Derringer Software)
6C - Same as 5C but set up as stamp set
Picture Disk Set 1 . . . . $19.95
7 - Miscellaneous Art Set #1
8 - Miscellaneous Art Set #2
9 - Miscellaneous Ads and Examples
Picture Disk Set 2 . . . . $19.95
10 - Miscellaneous Fonts
11C- Artifact color palette type fonts
Picture Disk Set 3 . . . . $14.95
12C- Art demo from WHITESMITH
13C- GRAPHICOM PART II function demo
Picture Disk Set 4 . . . . $14.95

GC II FONT DISKS

Each disk contains 10 or more fonts. (4 versions of each font, one for each display mode).
14C- GCII Fonts Disk #1
15C- GCII Fonts Disk #2
16C- GCII Fonts Disk #3
GRAPHICOM PART II Font Disks . . . $19.95

TRIPLE TRANSFER UTILITY ©

Transfer contents of disk to tape • Transfer contents of tape to disk • Automatically relocates cassette programs that conflict with the disk operating system • Displays machine language program addresses • Copies ASCII, Basic, & Machine Language Programs • All contained in 1 menu driven program!
REQUIRES 32K CC EXT.

Disk $24.95 . . . . Cat. No. 105CD

SUPER BACK-UP UTILITY ©

. . . WITH S.B.U. FROM COMPUTIZE — YOU'LL NEVER NEED ANOTHER BACK-UP UTILITY FOR YOUR COCO!!!
SUPER BACK-UP UTILITY WILL PERFORM **ALL** OF THE FOLLOWING FUNCTIONS:

1. **TAPE TO TAPE** (Regardless of most protection schemes!)
2. **TAPE TO DISK** (Move Cassette programs to Disk!)
3. **AUTO RELOCATE** (For those Cassette programs that conflict with Disk operating systems.)
4. **DISK TO TAPE** (Place Disk programs onto Cassette)
5. **DISK TO DISK** (Our powerful Split-N-Image Program, Copies regardless of protection schemes!)

- **MENU DRIVEN**
- **REQUIRES 32K EXTENDED COCO**
- **REQUIRES 1 OR 2 DRIVES**
- **ALL MACHINE LANGUAGE!!!**

COMPARE WITH OTHER INDIVIDUAL PROGRAMS COSTING IN EXCESS OF $100.00
DISK $49.95 . . . . Cat. No. 107CD

SPIT-N-IMAGE ©

M/L Disk Back-Up Utility

There is no need to suffer the heartbreak of crashed disks any longer. Spit-N-Image will create a mirror image of your valuable disk programs which do not respond to normal back-up functions. Will also initialize and back-up in one pass. Data processing experts always insist on having a back-up — it's good a practice.
REQUIRES 32K CC
DISK $34.95 . . . . Cat. No. 101CD

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Check or M.O.
Add $3.00
shipping

Computize INC.

(215) 946-7260 P.O. BOX 207 • LANGHORNE, PA 19047

PA residents
add 6%
sales tax

SPECIALS

Howard Medical Computers

Zenith 130 Color Monitor

$159
Was $399
($14 shipping)

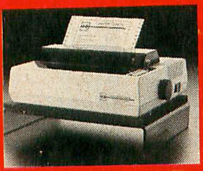
NEW 40 COLUMN

- Medium resolution 2.5 MHz 240 x 200 dots
- Same as 131 except No RGB
- With 90 day Zenith warranty
- **Monitors require video controller See page 34**

Epson RX-80FT

$207
Was $318
($7 shipping)

REPACK



- Friction and tractor 80 column
- Bidirectional dot addressable 100 CPS
- Free Howard Printer tutorial included (a $29.95 value)
  RX100 $362 each

Zenith Green Monitor

$67.50
Reg. $149
($7 shipping)

REPACK 80 COLUMN

- 12″ Zenith 123A Green Screen is easy on the eyes
- High resolution: 640 dots x 200 dots, 15 MHz band width
- Composite video monochrome

New! J&M Controller

JFD-CP with JDOS

$128
Reg. $149
($2 shipping)

- Eliminates software compatibility problems
- Single switch lets you switch from J DOS to RS DOS
- Gold contacts & data separator
- New serial port so you don't need a serial interface for a parallel printer

RS DOS ROM

$20/ea.
Reg. $40
($2 shipping)

- ROM chip makes J&M compatible
- 24 pin fits both versions of J&M controller
- Release 1.1

Howard Medical Computers

hicago, IL 60690

Hours: 8-4 Mon.-Fri.
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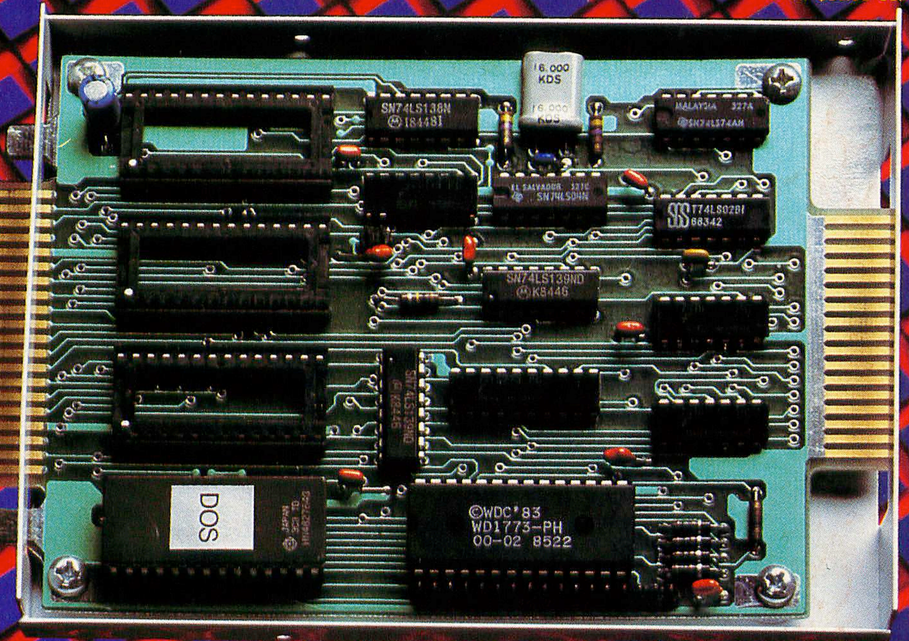
dical offers a 30-day return guarantee on all hardware we sell. Return equipment to us within 30 days for a u are unsatisfied for any reason. Quantities limited and subject to availability.

DISTO

SUPER CONTROLLER

RAINBOW

ONLY $99.95 US.



FEATURES:

- Gold contacts on all connectors.
- Shielded metal box for low RF noise.
- 4 28-pin sockets for software expandability.
- Uses 2764 or 27128 EPROMS.
- EPROMS are software selectable.
- Internal Mini-Expansion Bus interface for;
  - 80 Columns
  - Real Time Clock and/or
  - Parallel Printer or
  - EPROM Programmer or
  - User Projects.
- Complete Radio Shack compatibility.
- New technology, no adjustments needed.
- Very Accurate 16mhz High Speed Master Clock.
- Needs +5 volts only, works on all COCOs or COCO IIs.

EXPANSION ADD-ONS:

There are currently four add-ons available from DISTO for this controller;

PPRINT

The first is a Centronics Compatible Parallel Printer adapter. This adapter will allow you to connect a Centronics compatible printer directly to your controller, leaving the serial port of your computer free for your modem. Printer driver software included.

RTIME

The second is a Real Time Clock. This is a clock chip that will keep the proper time, date and year. A small battery keeps the time when the Computer is off, retreive and set the time by using simple Basic POKES. Also available with the Real Time Clock is the optional Centronics Compatible Parallel Printer adapter. Software to set the clock and printer driver included.

MPROM

The third is a Mini EPROM Programmer. Yes, a low cost programmer that attaches to the disk controller. A must for the DISTO Super Controller. Program those often used utilities into EPROM and plug them directly into your controller. Will program 2764's or 27128's, a perfect mate for the DISTO Super Controller.

DISPLAY80

The fourth is a real knock-out. This is a three in one card. It's major function is to add an 80* 24 display to your computer. A feature packed package also includes RTIME and PPRINT. All in one neat package that fits inside the controller. OS9 software available. Call for more information.

CREDITS:

The DISTO Super Controller, add-ons and all its documentation are conceived and designed by Tony Distefano. The DISTO Super Controller and add-ons are manufactured and distributed by; C.R.C. COMPUTER INC.
10802 Lajeunesse, Montréal, Québec, Canada H3L 2E8 1-514-383-5293

*DISTO and CRC Computers are registered trade marks. The DISTO Super Controller and add-ons are copywrited by DISTO.

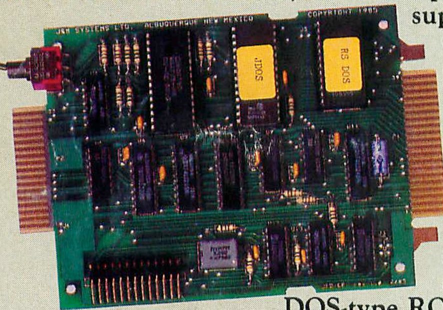
HEAT UP YOUR COCO!

New HARD DRIVES

Besides the obvious advantage of increased disk access speeds and a vast amount of storage, our COCO hard drives boast many innovative features. For instance, you may boot OS/9 directly from JDOS - no intermediate boot floppy is required. Our software can run with virtually any winchester with a ST412 type interface. Our drives have capacities of 5, 10, or 20 MBytes (formatted), and may be either partitioned into up to 7 logical units or left as one large logical unit. Our COCO hard drive systems are complete with case, power supply, cables, OS/9 drivers, and instructions. Prerequisite: OS/9, JFD-CP controller.

5¼" 5 MByte full size	$495
5¼" 10 MByte ½ size	$650
3½" 20 MByte (shown above)	$795

JFD-CP DISK CONTROLLER



Our new JFD-CP, compatible with both the original COCO and the COCO 2, features a parallel port to support a Centronics compatible printer or our hard drive, and an external ROM switch, which allows you to select JDOS or an optional RS DOS-type ROM. It comes in a case and includes JDOS 1.2 and manual. JDOS implements all RS DOS commands, plus many more, including auto line numbering, error trapping, baud rate selection, OS/9* boot from floppy or hard drive, and Memory Minder**, our disk drive analysis program (Precision Alignment Disk not included).

JFD-CP Disk Controller with JDOS	$139

COCO-CLASSIC

Our old JFD-COCO controller remains a strong seller. Some people just like old "classics" best! So we have brought it back at the lowest price ever!

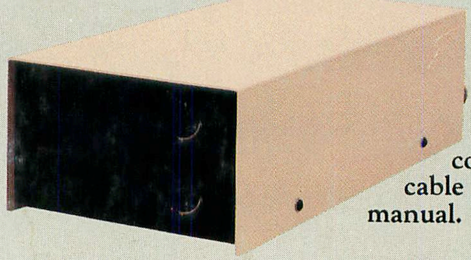
JFD-COCO Disk Controller with JDOS	$99

New TERMS

One-year warranty on parts & labor; 30-day money back guarantee (except shipping) if not totally satisfied. Items must be returned in like new condition.

Free shipping via UPS in continental United States for payment by VISA, MasterCard, or cashiers check. COD requires 10% prepayment by bank card plus 3% shipping. Blue Label and foreign shipping extra.

DRIVE SYSTEMS



Upgrade your Color Computer by adding our new JFD-CP disk controller, supercharged with JDOS 1.2 operating system, and a top quality drive with case and power supply. Comes complete with cable and JDOS manual.

Drive 0 System with one single side drive	$279
Drive 0 System with one double side drive	$349
Drive 0,1 System with two single side drives	$389
Drive 0,1 System with two double side drives	$489

MEMORY MINDER**

memory minder
A DISK DRIVE ANALYZER
J&M SYSTEMS LTD.
MEMORY MINDER
Dysan
DDD
Dysan
CE Division

Memory Minder is a disk drive test program now included in JDOS. Used with a Precision Alignment Disk, Memory Minder allows you to check your drives for speed, alignment, sensitivity, hysteresis, and more! You can actually align or adjust the drives while viewing the graphics on the screen. No special equipment needed!

PRECISION ALIGNMENT DISKS (From Dysan)	
PAD-40X1: Tests single side disk drives	$26
PAD-40X2: Tests double/single disk drives	$33

Memory Minder is available on diskette for those who don't own a JFD-CP controller with JDOS. Includes Precision Alignment disk.

Memory Minder: single side package	$59
Memory Minder: single/double side package	$75

*OS/9 is a registered trademark of Microware, Inc.
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